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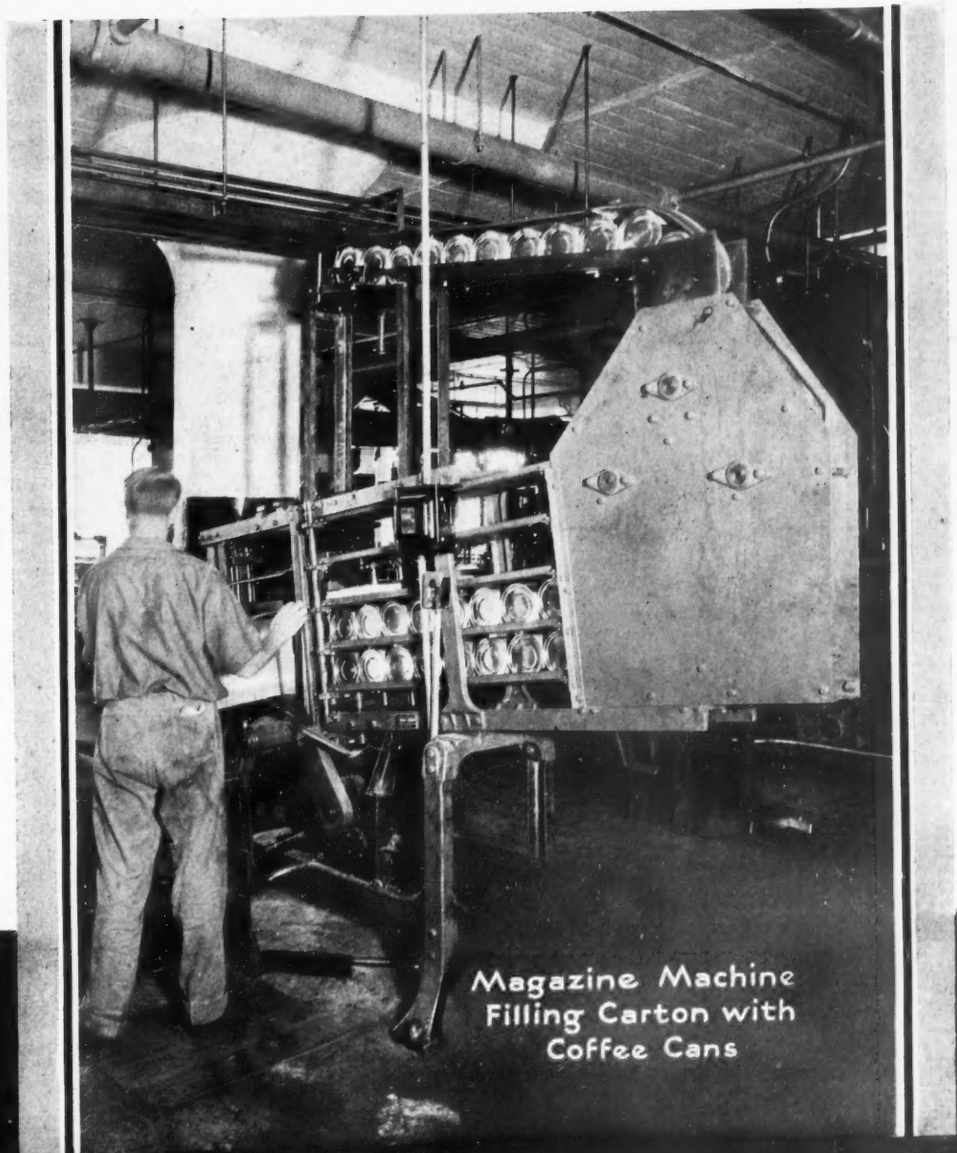

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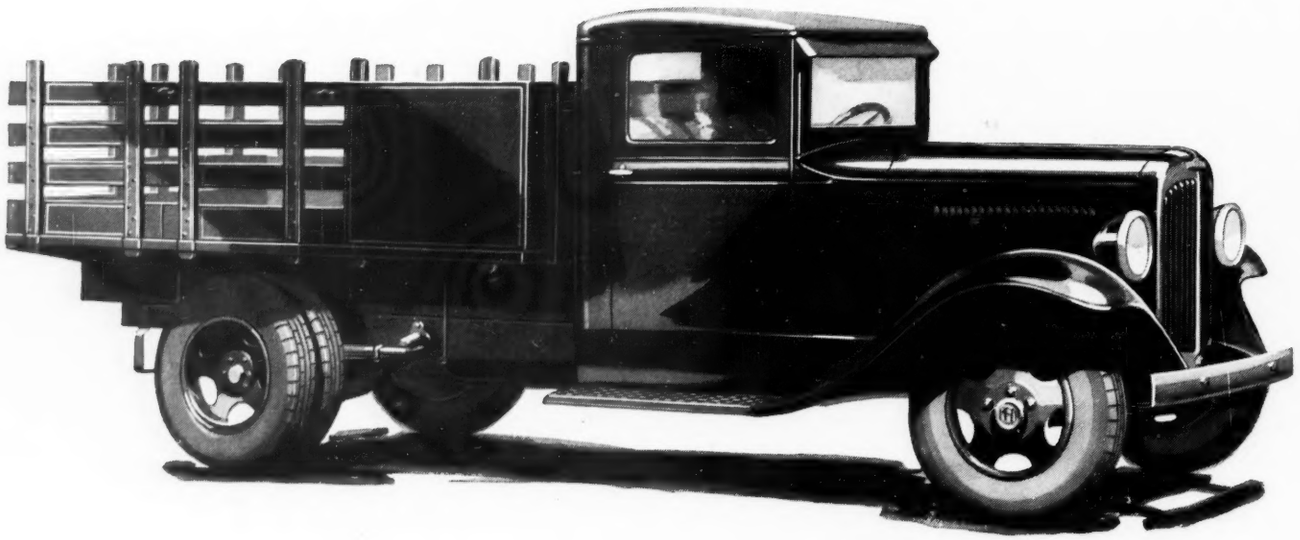

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VOLUME 3

FOOD INDUSTRIES

NUMBER 8

The Journal Devoted to the Problems of the Food Manufacturer

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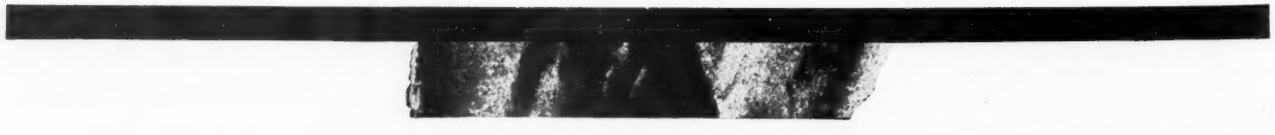

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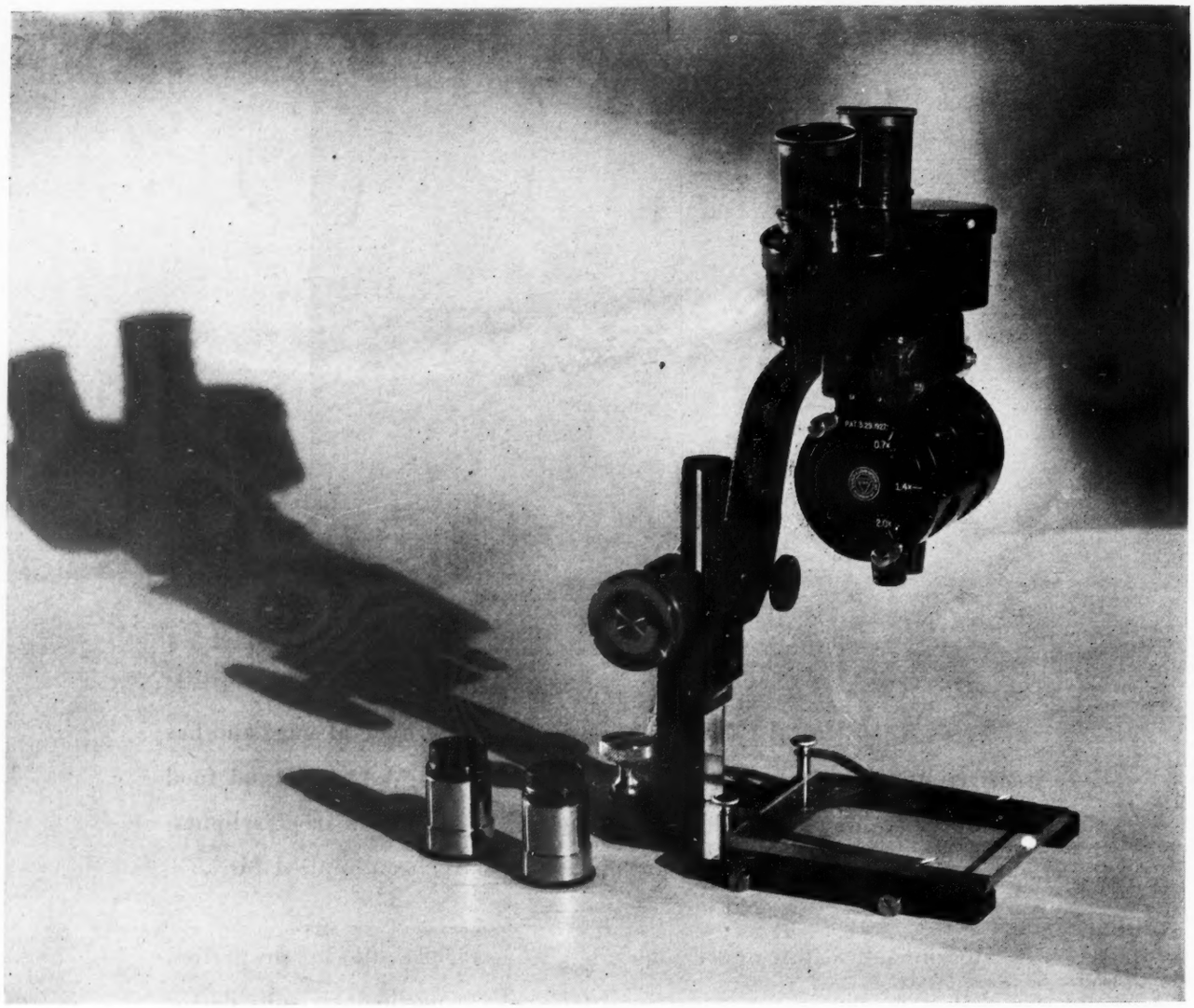

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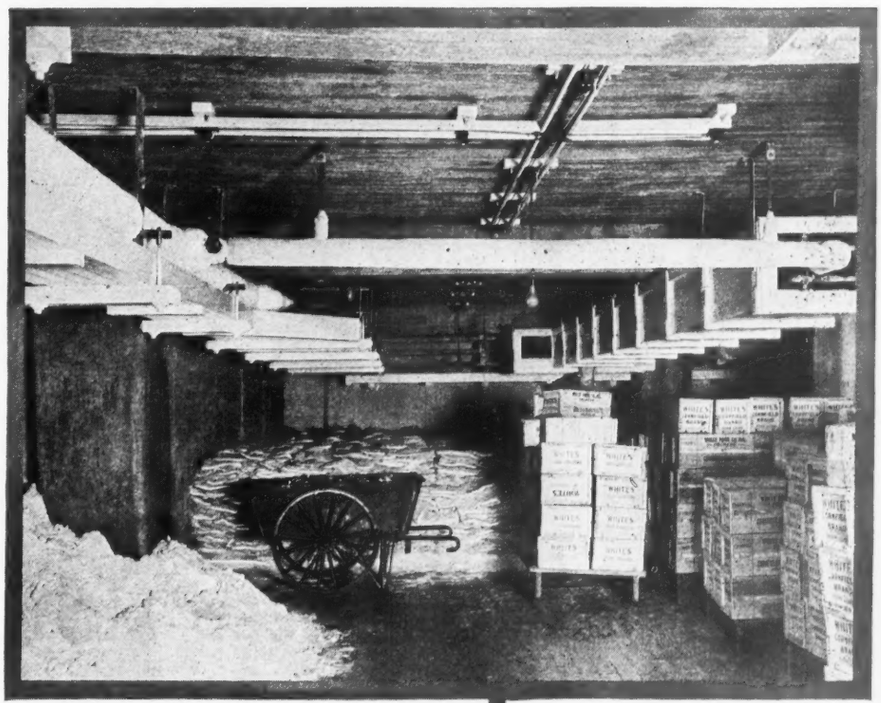

SUMMER days grow hot in Georgia. The sun's rays beat down with a heat that goes right through brick and wood. But food must be kept fresh. And refrigeration does it—helped by cork.

For instance, there's this storage room of the White Provision Company in Atlanta. Salt meat is stored in this room before shipping. Concrete and brick form the structure of the building—6 inches of Armstrong's Corkboard on outside walls and 4 inches on interior walls keep out unwanted high temperatures.

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Lard Room of the White Provision Company, guarded by 4 inches of Armstrong's Corkboard.

Armstrong's Corkboard Insulation

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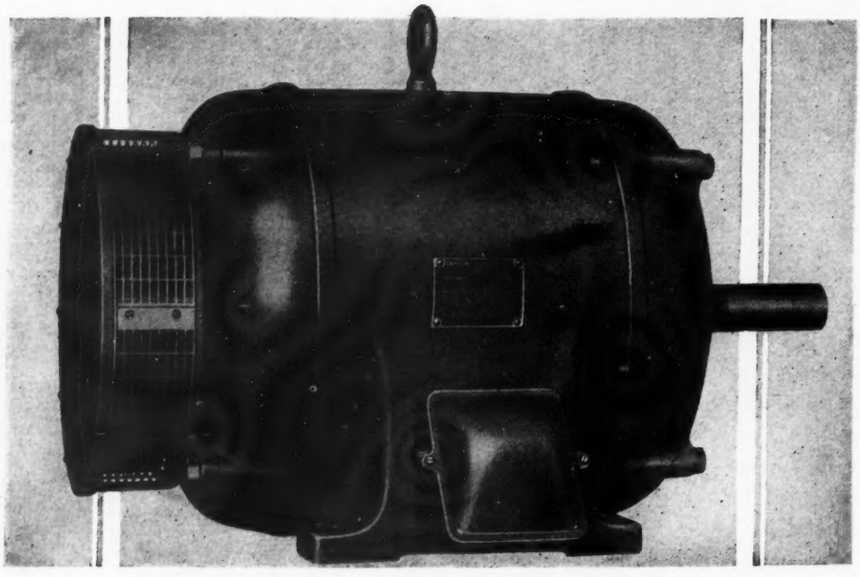
THEY KEEP A-RUNNING



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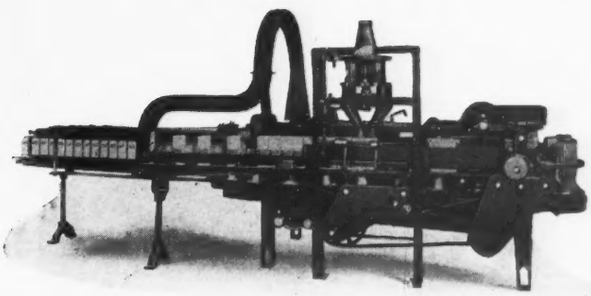

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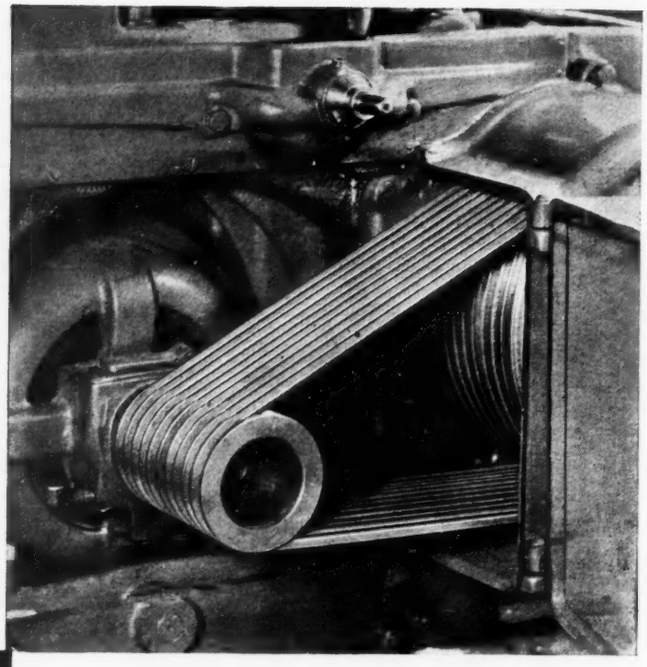

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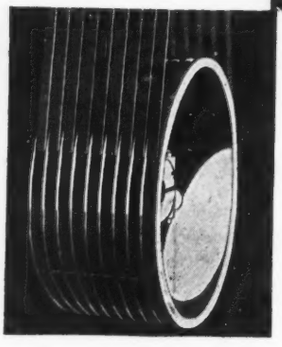

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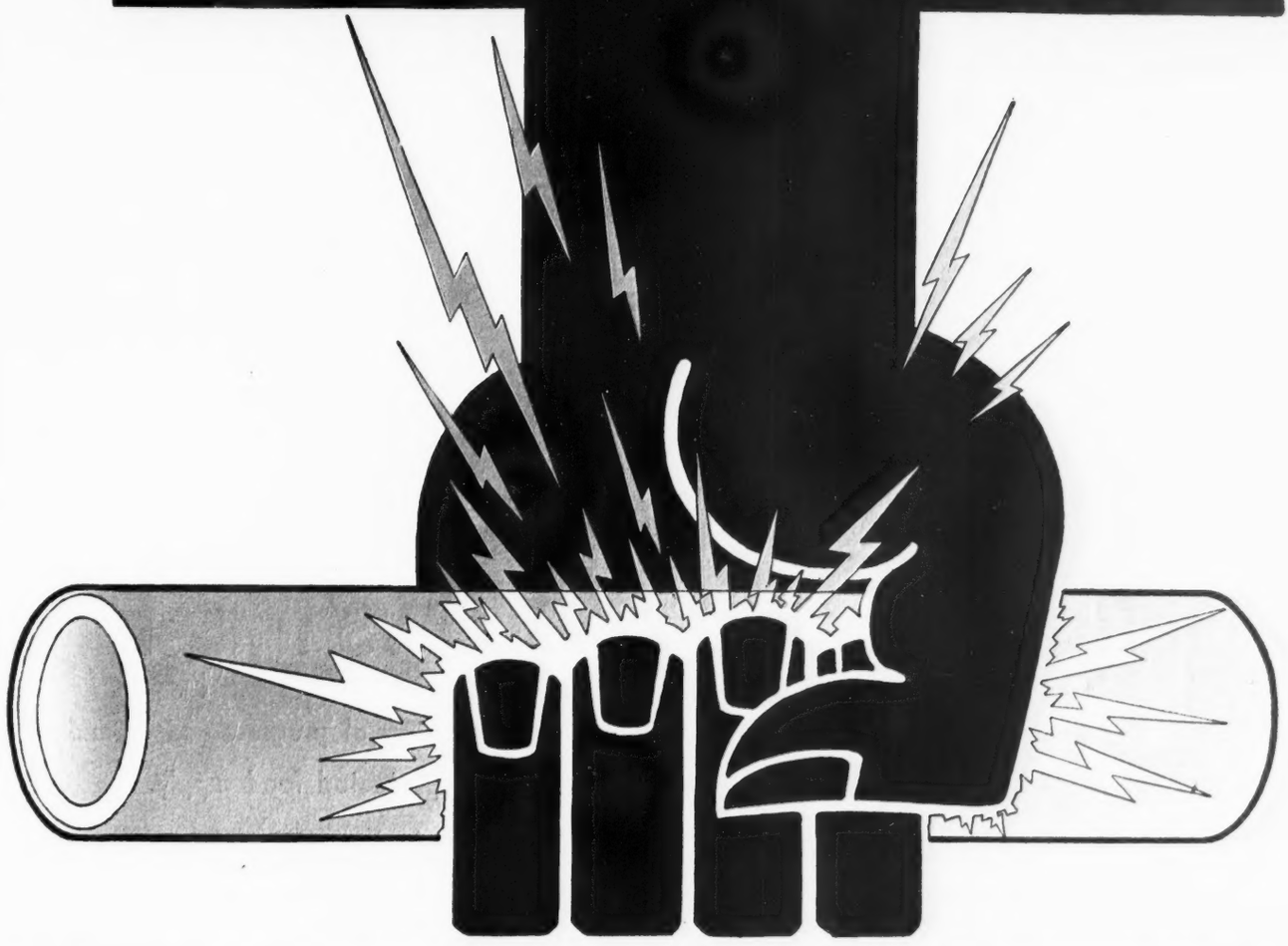

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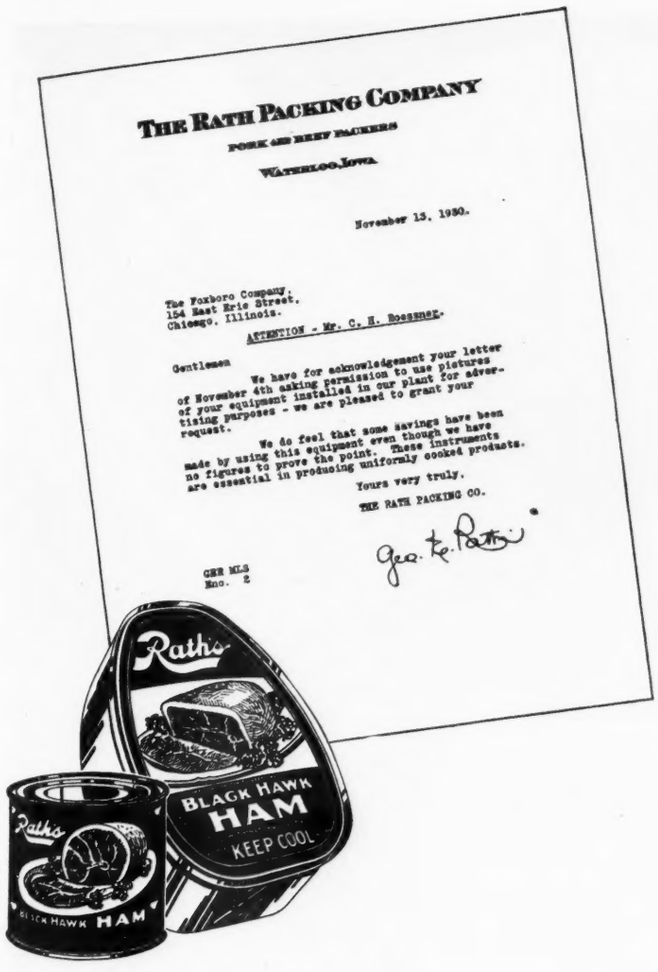
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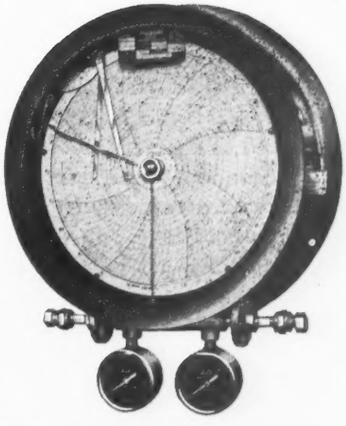

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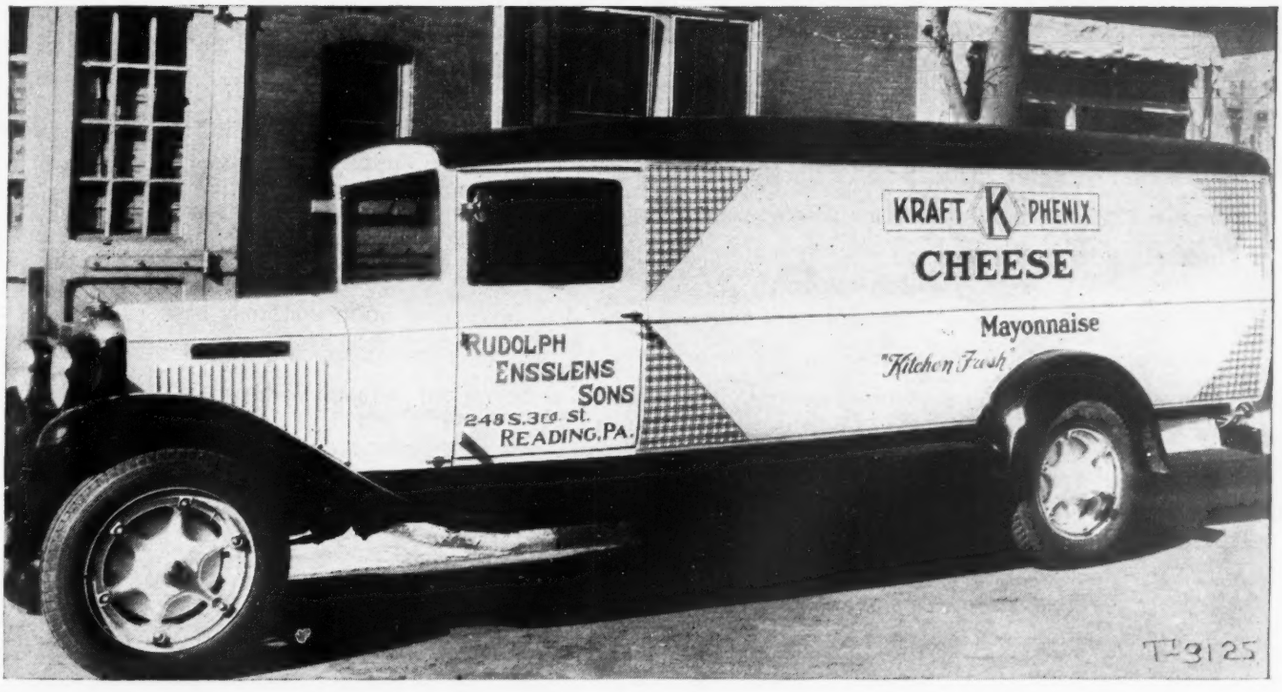

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AMERICAN CAN COMPANY CANCO

FOOD INDUSTRIES

The Journal Devoted to the Problems of the Food Manufacturer

Volume 3.....A McGraw-Hill Publication—Established 1928.....Number 8

NEW YORK, AUGUST, 1931

•

Laurence V. Burton, Editor

That Neglected Time Factor

WHEN A NEW METHOD is developed by research and later proves to be an industrial failure, management may be mystified, not to say outraged. Unless the research department has semi-plant-scale equipment available to try out new methods, or is manned by food engineers with large-scale plant experience, these failures are likely to recur too frequently.

NO SINGLE CAUSE of this form of difficulty appears more frequently than the neglect of the time factors involved in processes. For example, in the laboratory it is possible to heat or cool a quart or gallon of material with great rapidity. The time required may be very short, perhaps as little as three minutes, but how long does it take to effect the same amount of heating or cooling of a 500-, 1,000-, or 10,000-gallon batch? If three minutes was required in the laboratory for one gallon, the same rate of heat transfer would require 3,000 minutes, or more than two days, for 1,000 gallons. No production man would stand for that.

THEREFORE, in planning a new industrial operation, an effort would be made to shorten the time. One way is to increase the heating or cooling surface, but the more common way is to increase the temperature differential, because increased surfaces usually cost much more than the value of the excessive heat or cold capitalized at normal rates. Suppose that the latter method should be adopted and the time factor for a 1,000-gallon batch be shortened from 30 hours to 1 hour, or even 2 hours. A proportionately higher temperature differential will be needed, and as a result two conditions will arise.

FIRST, the entire mass of the product will be subjected to heat or cold, as the case may be, for a total period corresponding to the time of treatment, which in this case is 1 or 2 hours. What will be the effect on the product of being held for this period at the temperatures involved? And second, most of the product will have been brought into contact with heating or cooling surfaces having a temperature that presumably is far different from that involved in laboratory tests. Where heating is involved the effect on the product may be disastrous, such as scorching or burning at the point of contact. All these secondary effects must be studied before one can develop a laboratory process into a successful plant process. Space will not permit a consideration of other secondary effects, such as stirring, surface evaporation, aeration, oxidation, and the like.

BIGGER AND BETTER, in true American style, is not always the best way to achieve a desired end, unless one positively knows the effect of bigger will be definitely better. To condemn multiple small-unit operations hastily is a mistake, for management may have learned, consciously or unconsciously, that the time factor cannot be neglected. Success with new methods requires painstaking care and foresight.

When Will Business Improve?

RECOVERY of business to that very unusual condition called normal will come some time in the future. Its exact date nobody knows, because it seems to depend as much on ourselves as on outside circumstances. War debts, reparations, tariffs, Soviet "dumping," and politics may all be factors in summing up or evaluating the future, but the big fact remains that we still possess about 75 or 80 per cent of our normal business demand.

Much of this business can be done at a profit by making proper readjustments, coupled with aggressive salesmanship, directed by courageous management. When the majority of business enterprises learn to adjust their affairs so that they can make a profit on the amount of business that is now available, we can look for recovery. Indeed, this is the very mechanism of getting back to normal.

What is normal business, anyway? If volume were the criterion of normality, then the well-known practice of selling at a loss to get volume would bring normal business, but it does not work out in practice. Normal business involves more than volume; it is business done at a profit! Volume is only secondary. And of course it is evident that this concept must be the basis of all successful long-range plans for the future.

It is very difficult to visualize any result, other than postponement of the day of general business recovery, by continually doing business at a loss. There is a limit to the capital resources of any individual firm.

Business is now in competition with its most formidable of all opponents, *fear*. No one can economize so relentlessly as the person who is afraid of the economic future. Savings banks are now receiving much of the money that should be going into the channels of trade, and this situation will continue until business wins the contest with fear. So long as fear dominates, the available 75 or 80 per cent of normal business will be no more the irreducible minimum.

The lure of bargain prices must ultimately win the contest with fear, but it should be remembered that financial statements showing reasonable profits will do much more to restore public confidence than statements of loss. Profits cannot be made by doing business at a loss. Therefore, if business recovery is to take place, management must learn how to make a profit today.

Will Refrigerated Compartment Trucks Solve Distribution Problems?

IN SPITE of rapid strides made in the merchandising of refrigerated and frozen foods, the accomplishments have been so sporadic and localized that development of new industries is being hindered and year-round activities in long-established businesses are prevented. Marketing of frozen meats, fruits, and vegetables is largely confined to the localities in which they are produced, unless shipments can be made in carload lots, or at an expensive express rate in bulky packages with or without solid CO_2 as refrigerant. Lack of refrigerated distribution facilities for small shipments prevents a well-established concern specializing in consumer package products from obtaining a wide sale of its ready-to-bake, Southern-style biscuits. Again, supply to consumers is limited to localities near the source.

Production of chocolate and chocolate-covered confectionery is markedly curtailed during summer months because lack of refrigerated distribution prevents consumers from receiving such a perishable semi-luxury in an appetizing condition. Consumption of custard-filled pastries and prepared desserts during summer and early autumn months becomes hazardous because non-refrigerated transportation and temperatures of marketing conditions encourage rapid development of micro-organisms that may give rise to intestinal disturbances. Many other examples could be cited to lend force to the argument for initiation and development of a distribution service whereby foods requiring refrigerated and low-temperature conditions can have an opportunity to become staple articles of commerce.

We do not for a moment think the problem an easy one to solve. To be enduring, this service will have to show a profit to the one rendering the service, as well as meet the need of those using it. Such a service would not have to start from scratch, however, for existing trucking corporations are looking for ways of increasing their intercity pay loads and local distributors are anxious to increase the number of their patrons in the localities they serve.

Why do not the producers of these perishable new or seasonal products cooperate to encourage the introduction of refrigerated compartment trucks into the existing truck fleets? With such facilities, broken-lot shipments of perishable products could be made from carload-shipment centers to wholesalers and retailers equipped to market the products in first-class condition. It is worthy of a thorough investigation.

What Is the Matter With Future Sales?

BACK in pre-war days when the production of seasonal goods was often insufficient to meet the demand, any buyer who failed to make forward commitments for future delivery was frequently compelled to pay for his lack of foresight by higher prices for spot goods later in the year. Under such a set of conditions, whenever a new corporation was formed to manufacture seasonal goods, the entire production of the projected plant could be sold in advance.

In those days future sales contracts usually were accepted by financial institutions as evidence of justification for substantial commercial loans. It helped to create a great many new plants, and some buyers took advantage of this method of stimulating a tremendous production of those items which particularly interested them. And now in the long post-war period we find many buyers dictating prices to their sources of supply, a condition which began long before the slump of 1929.

Today complaints come from many sides that buyers will no longer purchase futures the absence of which, it is often asserted, will hamper the proper production of foods for the country. We are inclined to question the soundness of this form of plaint, for when a corporation's financing depends upon "hocking" future sales contracts, that company is in a rather precarious financial situation and needs more working capital and less borrowed money.

On the other hand, the buyer has an interest that also should be recognized and reckoned with. As long as he can buy spot goods for the same or lower prices than he must pay for futures, he is hardly justified in making very many future purchases.

Has the institution known as selling futures outlived its usefulness? We do not think so. A future purchase,

after all, is only a buyer's safeguard against future higher prices, but when an industry will in effect donate that security, then it can hardly expect to sell that which it is already giving away.

How Much Is a Vacuum?

MUCH confusion and loose thinking relative to vacuum technology is apparent, which ought to be corrected. Vacuum is an old tool of food processing that is due for a marked revival in 1931, and we regret to observe that few seem to understand correctly some of its applications.

De-aeration of tomato juice is absolutely essential before processing with heat, if the original vitamin C content is to be retained; and likewise it is extremely important for retaining the original flavor of orange juice, irrespective of the method of preservation employed—whether it be quick-freezing or pasteurization. Vacuum is essential also to certain forms of canning, particularly in the so-called Geralizing process. It is also an essential for packing roasted coffee in hermetically sealed containers. It finds a further use in the concentration of fruit juices and in certain types of preserve cooking, as well as preserve packing, and of course, in all branches of the food industries requiring boiling at low temperatures, such as meat extracts, sugar, or evaporated milk manufacture, there is no possible substitute for vacuum.

In the de-aeration process, however, we find the greatest divergence of opinion on what constitutes a vacuum. Frankly, we believe it is nothing short of technical nonsense to consider a 14 or 15-inch vacuum as adequate for de-aeration unless the temperature of the liquid is high enough to be at a boiling point in such a vacuum. This means a temperature of 175 deg. F. for water or juices, and this temperature often is too high.

All this means that vacuums lower than 28 inches are more or less ineffectual makeshifts, particularly when one realizes that even in a 29-inch vacuum there still remains, roughly, 10 per cent of the original air. But as soon as one gets into the subject of high-vacuum technology, he finds there is plenty to learn. For example, not all of the dry vacuum pumps on the markets can maintain so high a vacuum in continuous heavy-duty operation. In our own factory operating days, we have fought vacuum for several years and speak from dearly bought experience. Sometimes the fault is with the pump, sometimes with the valves, and sometimes it is only the user who is to blame. But remember this: no matter how good it may be or how carefully installed or operated, no vacuum pump can possibly do the job and maintain the required vacuum if it is not large enough or if the motor is too small for the performance required.

Curiously enough, many persons find it difficult to comprehend a vacuum, for, in a sense, it is nothing but empty space. There is a tendency to regard it as a reality, because we say that we are pumping a vacuum or that we are piping vacuum around the plant, when, as a matter of absolute fact, we are doing nothing of the sort.

Then there is the time element which enters into de-aeration operations. It should be understood that no matter how high the vacuum, not all of the dissolved air will leave a product instantaneously. It takes time to accomplish this end. Those who are planning to use vacuum effectively, should study it thoroughly, or they may waste a lot of money uselessly.

Profits Through Individuality

IN this day of slim profits it is gratifying to learn that some firms are making normal and satisfactory earnings, despite the depression and price-cutting competition. One of them has just paid the usual bonus for 1931 to executives and department heads, amounting to more than 25 per cent of a year's salary, in addition to its usual dividends. In a field of endeavor where competition is properly described by the word desperate, its profits have been secure.

The reason is not hard to find. A study of its operations shows that the answer is found in its production department. That firm knows how to produce uniformly high quality at low costs—perhaps the lowest in its branch of the industry. It is a perfect example of what we have repeatedly mentioned in these columns, for it possesses individuality of equipment and methods.

If a concern possesses nothing else but the methods and equipment that anybody can purchase, its costs will be about the same as the other fellow's. In contrast to this condition is their highly individualized plant of the company referred to, where practically every machine has been developed for a specific purpose, either by pure invention or improvement upon existing available equipment, and most of it has been patented. Many years of effort will be required before competitors can even come close to its costs or accuracy of production control.

Research and development brains can be hired, but it is up to the production department to stimulate the achievement of individuality by providing ideas of what it wants to accomplish. By continuous and eternal cooperation of research and production, dividend-paying individuality can be attained. Never be satisfied!

Trimming the Captains of Industry

WITH considerable apprehension traffic managers of certain trunk-line railroads have learned of a proposed form of gas-tight container car which, it is predicted by its "inventor," will keep perishables in good condition for an indefinite period without refrigeration. If this should prove true, their large fleets of refrigerator cars, numbering as high as 20,000 cars per fleet, might soon be rendered worthless through obsolescence. No wonder they have been exercised over this unhappy prospect.

Their fears have been heightened by the fact that the president of a well-known railroad has urged members of a certain trunk-line association to give the new car a fair trial, free of tariff charges while it is being demonstrated. Thus the "inventor," if not the "invention," has the seeming indorsement of a railroad president and, in the absence of further definite knowledge, his apparent indorsement has carried great weight with other railroads.

What are the facts? The method of preservation proposed is that of storage in carbon dioxide gas and the "inventor" points to the test of the storage of oranges at Howey-in-the-Hills, Fla., as vindication of his process (see April, 1931, FOOD INDUSTRIES, page 176). The test was commenced, however, on April 8, and the tanks at Howey are not to be opened until August 8. Therefore, the Howey experiment is not yet a proved success, and from reports of the increasing pressure within these tanks we surmise that it may not be a success.

Feeding empties into can runways

Invention and Engineering Overcome High-Vacuum Pack Problems

By THOMAS M. RECTOR
Chemical Engineer
General Foods Corp.
New York City

A PROCESS by which coffee can be kept fresh for many months has several economic operating advantages over a process in which the coffee must be roasted and shipped fresh as ordered. The Vita-Fresh process, which removes over 99 per cent of the air in the container, was developed to give ground coffee the maximum preservative treatment thus far discovered. To reach the goal of removing over 99 per cent of the air in the container of ground coffee, the problem had to be studied from the angle of reaching this performance with a minimum of additional expense for power and added equipment.

High-speed vacuum-can closing machines of the type developed by the American Can Co. consist essentially of a central chamber containing the can seaming mechanism and a rotating valve which has pockets carrying the cans from the air, through a seal into the seaming chamber. A second valve of the same type is used to remove the can from the chamber. These machines evacuate and seal 60 cans every minute. A study of the operation of this machine indicated that it was not practicable to maintain a vacuum in the central chamber high enough to remove 99 per cent of the air from the cans by means of pumps connected to the central chamber, because of the large volume of air carried into the central chamber by the rotating valves. Despite difficulties involved in removing this volume of air from the valves before it reached the central chamber, further investigation and experimentation led to a new method which made is possible to exhaust cans under practical operating conditions to as low as 7.5 mm. absolute pressure. It is important to note that this was accomplished by the use of pumps of moderate capacity and with a much more economical vacuum installation than if it had been attempted to obtain the high vacuum by direct exhaustion of the central chamber through one pumping unit.

As soon as coffee packed under this high vacuum was tested under "blind" conditions against the commercial vacuum, it was found that the professional coffee-flavor experts selected the high-vacuum coffee as noticeably superior in "freshness" within as short period as two weeks. Longer periods widened the difference, though, of course, the commercial vacuum pack was still superior in freshness to the same coffee packed without vacuum. The skilled coffee taster can detect loss of "freshness" and development of "staleness" in non-vacuum packed coffee in from three to five days after the coffee is roasted and ground.

After determining the conditions under which this high-vacuum coffee was to be packed the production department was faced squarely with the dilemma of carrying on the "slip-cover" coffee production at the regular rate, installing the new equipment for an increased quantity high-vacuum production, operating the two types of packing in the same factory space for about 3 days and finally removing the "slip-cover" packing lines without disturbing high-vacuum production. This accomplishment is a story in itself and the difficulties probably never will be fully appreciated except by the men who did the job.

The accompanying drawings will give an idea of how the change was made. Fig. 1 shows the original "slip-cover" layout. Fig. 2 indicates the "slip-cover" line expanded to fit around the walls of the packing room by means of temporary conveyors, and depicts the first vacuum machines. Fig. 3 gives the complete layout of the high-vacuum or Vita-Fresh installations, which pack coffee under the highest vacuum ever obtained commercially in tin cans.

The packing room for coffee in slip-cover cans contained the following equipment: can runways from the can shop on the floor above, four automatic filling machines with a capacity of 60 cans per minute each, collecting conveyors from the filling machines, and automatic slip-cover cappers. Following the cappers were high-speed labeling and casing machines, top and bottom sealers, and compression units. This equipment was arranged as illustrated in Fig. 1. A casual glance at this layout would indicate that it would be almost impossible to put any more equipment in this room and operate it efficiently.

Fig. 2, however, shows how during the transition period, the old equipment was arranged so that three complete vacuum lines of 60 cans per minute capacity were placed in the center of the room, while one complete line of slip-cover cans was run around the outside. It will be noted that an additional filling machine was inserted for one vacuum line, and that two of the old

filling machines were connected with the vacuum canning units. Two of the old filling machines remained connected to the old collecting conveyor, and the output of these machines ran to the automatic capper. Labeler, casing machine, top and bottom sealer, and compressor units have been moved over against the wall and connected by means of temporary conveyors.

The original equipment had a capacity of 240 cans per minute; the capacity of the transition equipment was 300 cans per minute.

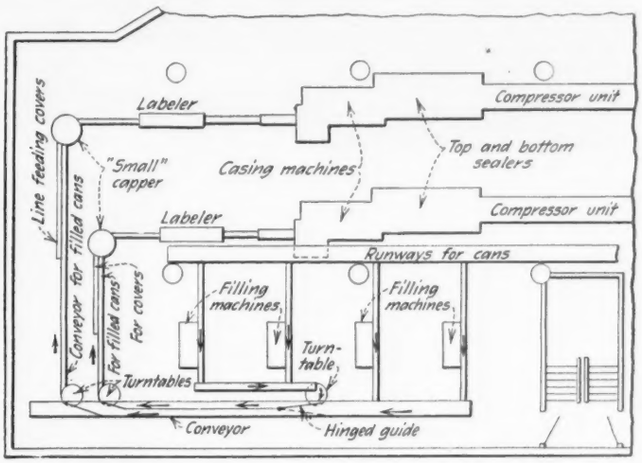
Fig. 3 shows the vacuum installation completed. A sixth filling machine has been installed in the space occupied by the conveyor to the slip-cover capper. In addition, a 3-lb. vacuum closing machine has been connected to one filling machine, so that on one vacuum line coffee may be packed in either 3-lb. or 1-lb. cans. The production of the packing room has now been stepped up to 360 1-lb. cans per minute, with the alternative of running 300 1-lb. cans and 30 3-lb. cans. It is also possible by the use of changed parts to convert one 1-lb. line to a ½-lb. line, packing at the rate of 60 ½-lb. cans per minute. In order to put this increased packing capacity in the space available, it was necessary to place the casing and sealing equipment in an adjoining space on the same floor. The final arrangement is very orderly and compact.

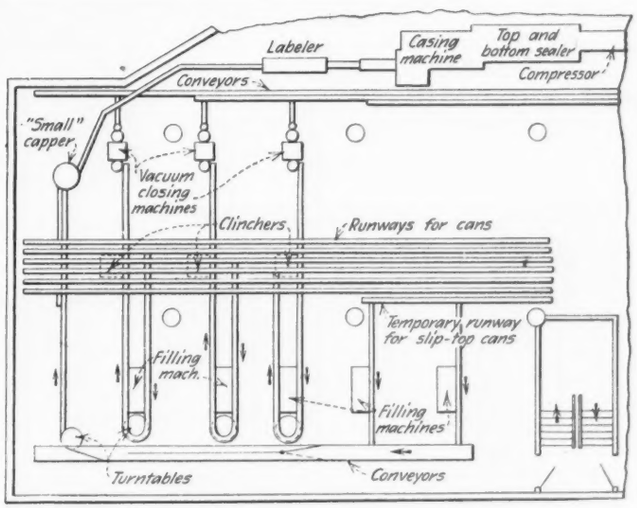
When vacuum packed coffee was first placed on the market, machinery was comparatively slow in speed and low in efficiency. Containers were never uniformly airtight and were very awkward for the consumer to open. Vacuum pumps were far from their present state of efficiency. From this inauspicious beginning the sale of vacuum-packed coffee grew largely without advertising and without modern type of mass merchandising. Obviously it is more expensive to pack coffee in a precision built container capable of holding a high vacuum almost indefinitely than to pack it in a paper bag, or even in the slip-cover tin with a loose cover and unsoldered end and side seams. Nevertheless, the consumer willingly paid the increased cost for the only reason possible to advance: namely, he was getting full value for his money in the form of better coffee; coffee with more aroma and more of the character of coffee fresh from the roaster.

The difference between fresh coffee and ground coffee sold in bags or slip-cover cans started the whole country thinking on the subject of coffee "freshness." The consumer who had formerly been satisfied to drink a bitter infusion of stale coffee began to demand fresh coffee, once he learned the difference. Then the coffee trade, as a whole, became "fresh" coffee conscious and retained scientists to study coffee "freshness" and the causes of deterioration.*

The laboratories found that freshly roasted coffee, after grinding, lost the indefinable quality of "freshness" in an unbelievably short time, and that coffee nine days old, unprotected from the air, was actually half "stale." Among the interesting facts that the laboratories have uncovered in roasted coffee is that it contains, when it leaves the roasters, a large volume of carbon dioxide

*FOOD INDUSTRIES, September, 1930, p. 401.





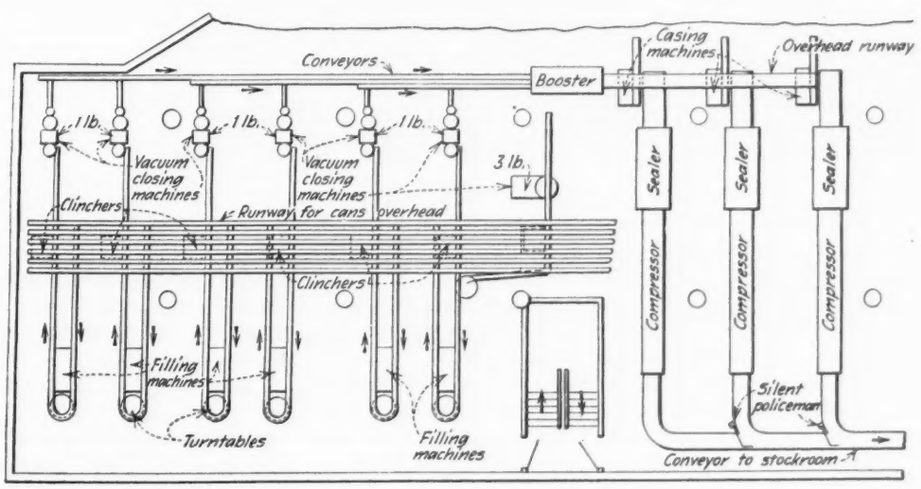
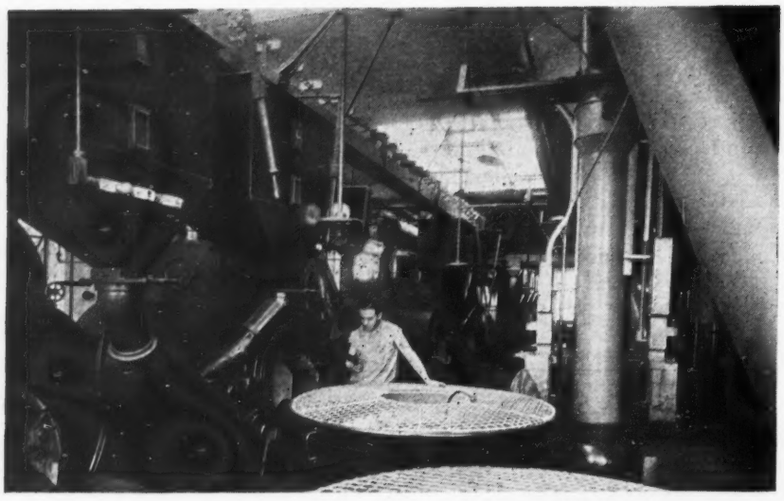


Fig. 1—Top: Original layout of coffee packing equipment

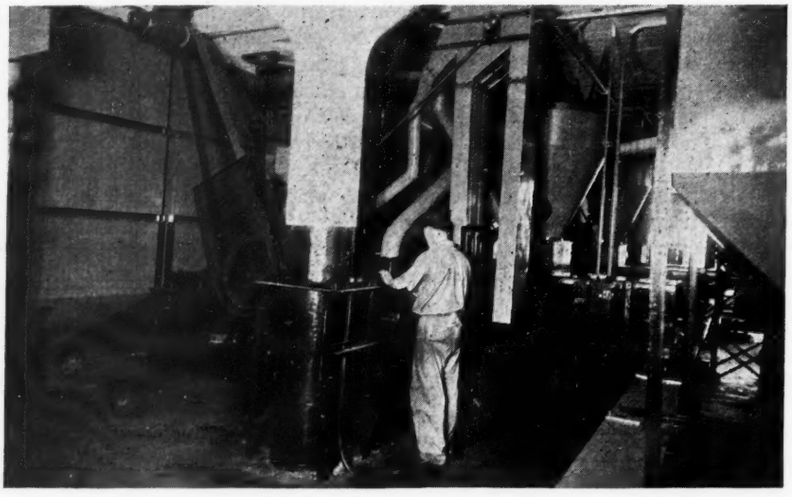
Fig. 2—Middle: Layout of coffee packing equipment during transition

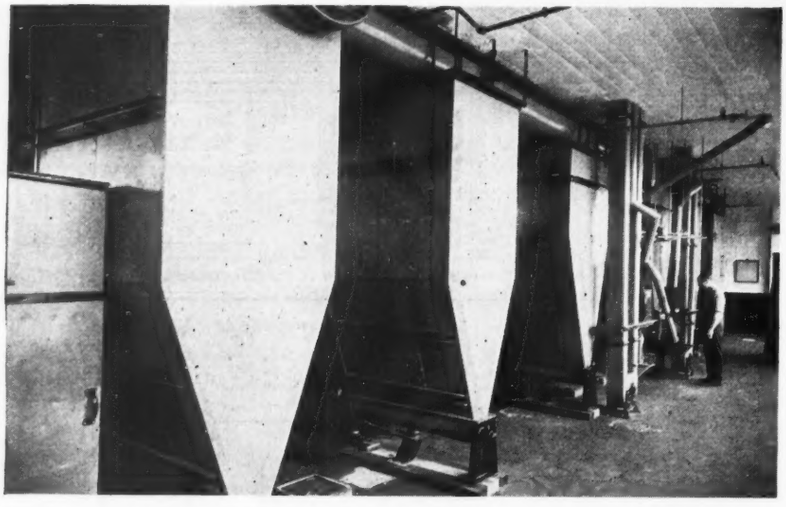
Fig. 3—Bottom: Completed high vacuum packing layout



ROASTING

GRINDING



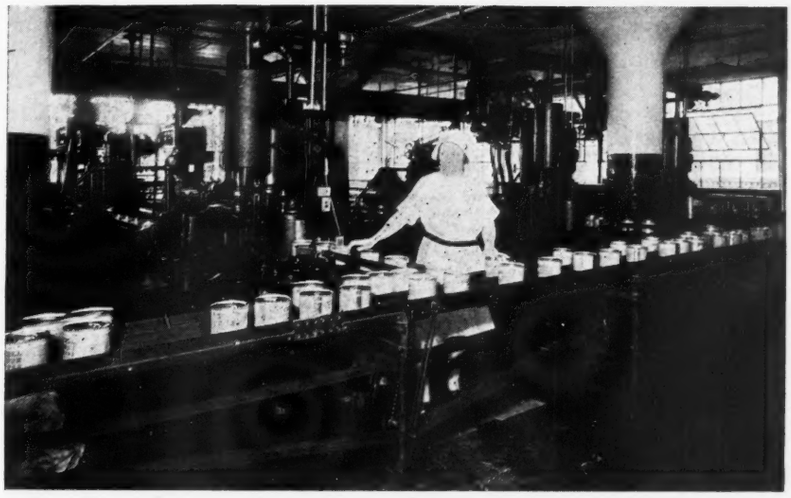


FEEDING

and other gases in small quantities. This gas is held within the coffee bean, apparently in small cells, under a pressure which tests indicate is about 150 lb. to the sq.in. This gas escapes from the coffee by diffusion. It leaves ground coffee much more rapidly than it does the bean. Ground coffee loses half of its gas in less than 48 hr., while bean coffee retains half of its gas for about a week. Loss of coffee freshness, if the coffee is exposed to air, seems to follow the loss of this "coffee gas" very closely. If coffee is packed under vacuum within a few minutes after grinding, obviously the vacuum will be filled gradually with coffee gas. The quantity of gas developed in roasted coffee varies with the degree of roast. It is a happy combination of "good luck and good management" that Maxwell House coffee is roasted and packed so that in a very short time the vacuum is sufficiently balanced by "coffee gas" within the can to protect against undue strain on the seal of the can.

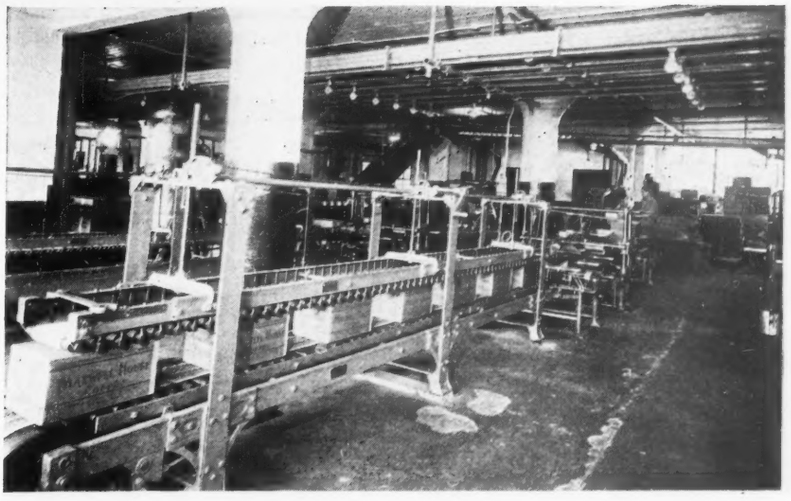
Among the many facts disclosed by this coffee research was that a cup of fresh coffee can be obtained only by making it within two or three days after roasting the coffee or by making it from coffee preserved.

FILLING



SEALING

PACKING



roaster-fresh, in a tight can from which the air has been excluded.

The high-vacuum process thus developed makes possible the elimination of all inland roasting plants and the continuation of only those which have the advantage of direct ocean freight connections with the coffee producing centers. The elimination of three large coffee roasting plants saved approximately 15 per cent of the cost of transporting raw coffee; roasted coffee weighs 15 per cent less than raw coffee. Also there were additional savings resulting from the elimination of "back hauls" from such points as Chicago and Nashville and from the substitution of through carload shipments for the much-handled l.c.l. shipments. Concentrating production in five plants instead of eight saved approximately 37½ per cent in general production overhead and released a very considerable fixed plant investment.

The Vita-Fresh process also makes it possible for all coffee plants to carry small working stocks. This advantage permits smoothing out the production curve from day to day and eliminating much overtime work as well as irregular employment of labor.

Materials and Markets Govern Food Plant Location

By EDWARD R. DEWEY*

FOOD manufacturing industries differ greatly in their geographical distribution. Some food manufacturing industries—bread and bakery products, for instance—are spread over the entire country. Some, like the cane-sugar refining industry, are highly concentrated; and the others have a moderate dispersion.

The widely dispersed industries are: (1) those making perishable or bulky commodities, chiefly for immediate or local consumption; and (2) those the raw materials of which are produced in widely scattered areas.

Accompanying this article are three maps: Fig. 1, a map showing the location of plants in the sugar refining industry; Fig. 2, a map showing the location of plants engaged primarily in roasting and grinding coffee and spices; and Fig. 3, a map showing the counties in which there are bakeries (doing more than $5,000 worth of business a year).

These three maps are not printed as a complete picture of the food industries. They are, however, as can be seen from the table, representative of three types of food manufacturing industries; namely, the widespread, the moderately concentrated, and the highly concentrated industries. The degree of concentration is of particular importance from the standpoint of those people who sell to the food industries, for the conditions illustrated by

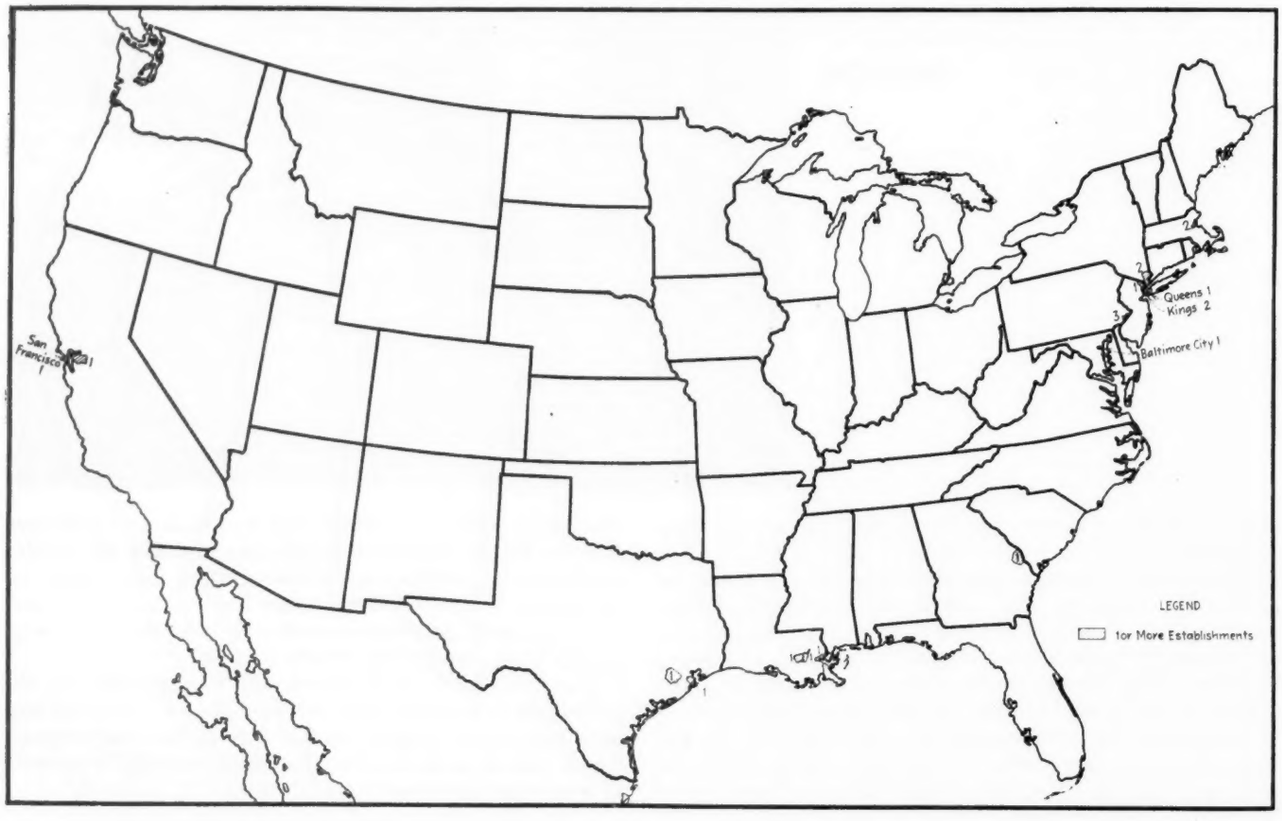
*Editor's note: Edward R. Dewey, the author of this article, is chief of industrial marketing, U. S. Bureau of the Census.

The 32 Food Industries Arranged According to Their Geographical Concentration

Name of Industry	Number of Counties in which there are Manufacturing Plants (Latest Available Data)
Malt	12
Cane-sugar refining	16
Cane sugar	18
Corn syrup, sugar, oil	20
Oleomargarine, other butter substitutes	22*
Lard substitutes, vegetable oils	24*
Rice cleaning and polishing	25
Chewing gum	29
Chocolate and cocoa products	30
Cereal preparations	56*
Sugar beets	60
Peanuts, other nuts, processed	76*
Canning and preserving, fish	89
Macaroni, spaghetti, vermicelli	97
Vinegar and cider	109*
Sausage, meat puddings	129
Flavoring extracts	134*
Food, prepared, not elsewhere classified	209*
Coffee and spice roasting	217
Feeds, prepared—animal, fowl	227*
Cheese	257
Condensed and evaporated milk	270*
Confectionery	401
Meat packing	516
Canning and preserving, fruits, vegetables, etc.	672
Ice cream	1086
Butter	1136
Flour, other grain-mill products	1516
Ice manufacturing	1523
Beverages	1601
Bread and other bakery products	1927

*More than 10 per cent by value of the products of this industry are made as secondary products of other industries.

Fig. 1—Location of plants engaged primarily in the refining of cane sugar (does not include establishments engaged primarily in the manufacture of sugar, raw or refined; molasses, and syrups, from cane)



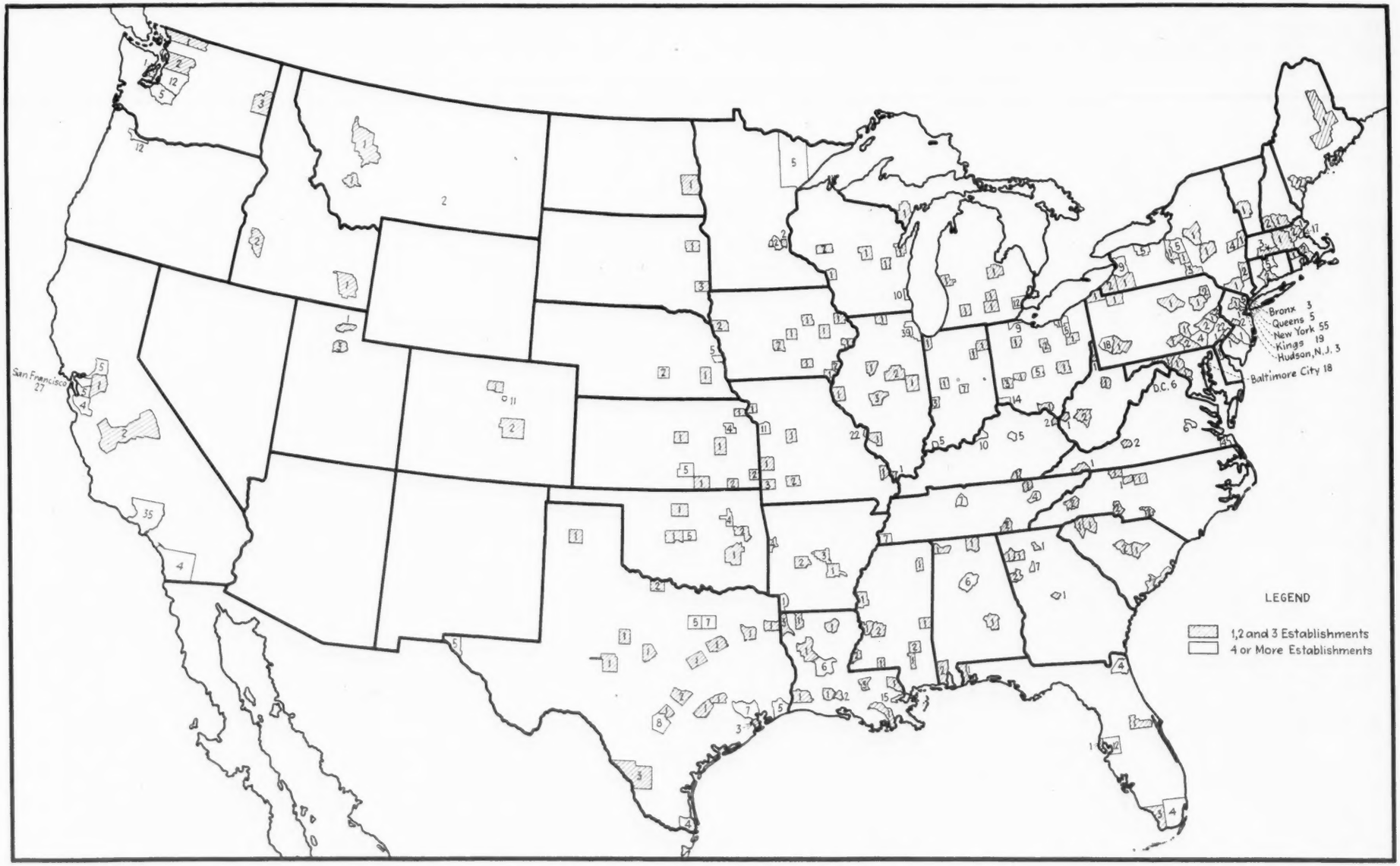


Fig. 2—Location of plants engaged primarily in roasting and grinding coffee and spices

the maps make necessary three separate kinds of marketing approach.

If an equipment or a material manufacturer sells to one of the widespread industries, as for example, the bakery industry, it is obvious from the bakery map that he must go into each state—in fact, into almost every county—if he is to make a thorough canvass of his market possibilities.

On the other hand, if he is desirous of reaching

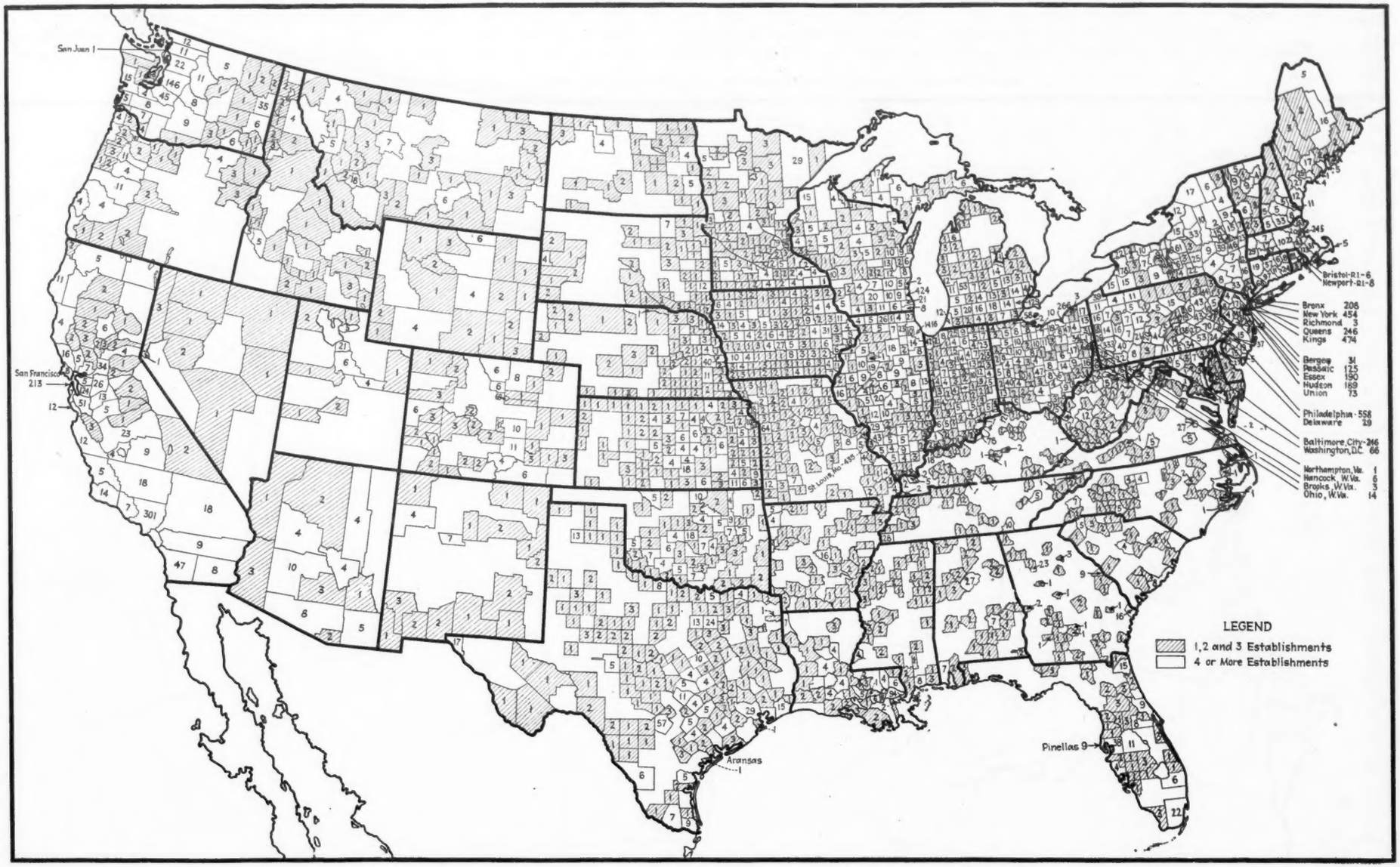


Fig. 3—Location of plants engaged primarily in the baking of bread and other bakery products

the concentrated industries, such as, for instance, the sugar refinery industry, he can do so by limiting his activities to a comparatively small number of counties in a still smaller number of states.

Industries of intermediate dispersion, of which coffee roasting is an example, form the third group.

The channels of distribution that are used to reach these various industries must vary according to the number to be reached and their location.

Do the Food Industries Need Added Policing?

By O. FRED ROST
Director, Surveys of Distribution
McGraw-Hill Publishing Co.

THE growth of the food industries has been marked by a steadily increasing tendency of federal, state, and municipal government to surround this or that branch with governmental restrictions, to establish definite rules of procedure, and sometimes to compel very costly observance of regulations of doubtful value. Cities compel pasteurization of milk; states have statutes covering food production; the federal government, operating chiefly through the Food and Drug Administration, is continually broadening its activities in that field.

While many of these efforts at regulation or control of food products undoubtedly are inspired by the best of motives, and have proved beneficial in every respect, others have become a distinctly retarding influence.

Within the last five or six years the country has witnessed a popular craze of interest in any food product that is rightly or wrongfully credited with some health-giving properties. The patent medicine period of the late "nineties" and the early years of the present century has been repeated, only this time food or allied products have been the vehicle. Where years ago bottled—presumably "medical"—preparations were bought widely because of the claims made for them by their manufacturers, the present generation buys packaged food products for the same reason.

In their anxiety to build sales, some manufacturers of food or allied products gradually have elaborated on what they claim for their goods to a point of gross exaggeration and in some cases actual untruthfulness. This condition attracted the attention of the medical profession and quite properly the American Medical Association set up, a year ago, a "committee on foods," presumably to test food products for which certain health-giving qualities were claimed.

This committee was to check the reading matter of cartons, circulars, and advertisements against what might reasonably be expected to be the effect of using the product as prescribed, and where so justified issue a certificate of approval, which carries with it permission to use the association's seal of approval on the product as well as in advertising and sales promotion.

If the activities of the committee had been confined within the original limits, little fault could be found with the plan. Now, however, Dr. Morris Fishbein, chairman of the committee on foods of the American Medical Association, has announced at the recent annual convention that his committee proposes to extend its operation to include all kinds of food products. He intends to (1) submit labeled foods to laboratory tests as to contents and purity, (2) check actual known properties of contents against reading matter on labels or in advertisements, (3) scrutinize all advertisements as to justification and truthfulness of claims advanced, (4) issue certificates of approval where warranted, (5) test the approved products frequently to insure continued and uniform adherence to approved standards, (6) maintain a continuous censorship over manufacturers' advertising copy.

The report presented by the committee covering the first year of its existence shows that 500 food products were submitted by their respective manufacturers but only 75, or 15 per cent, were granted permission to exhibit the association's seal. The remaining 425 were rejected for such causes as adulteration, misleading names, unjustified overemphasis of therapeutic qualities in advertising, obvious violation of the pure food law, and the like. The report mentions outstanding instances such as a bread product which was renamed in order to secure approval, a nationally known cereal that, so the committee insists, must be renamed before it can be approved, and two other cereals that must be relabeled or stand rejected.

While the present report covers operations that represent but a fraction of the field which actually embraces the nation's largest industry, it obviously forecasts the trend of results that the food industry may expect from this activity. Drastic demands may eventually be made upon food manufacturers if the committee continues to function on the present basis. Costly changes in brands, packaging, labeling, the scrapping of trademarked names possibly representing millions invested in goodwill and advertising may be urged.

Food manufacturers who have studied the committee's report and analyzed it raise some rather significant questions. For instance:

1. Should a national body of professional men that is presumably conducted on the highest ethical plane exceed the natural boundaries of its activities and attempt to assume police and regulatory powers over all of the country's food products?

2. Has the American Medical Association entered this field with a true appreciation of the responsibility toward the public that it thus assumes, and the stupendous magnitude of the task that is involved?

3. Has the American Medical Association weighed the serious consequences that may result from an inadequate organization that might by the very magnitude of the task, be forced to carry out its undertakings more or less haphazardly?

4. Has the American Medical Association attempted to appraise the disastrous effect that inadequate or inequitable administration of the work may have on smaller manufacturers, wholesalers, and present methods of distribution?

In connection with the first question it is argued by many that the American Medical Association is setting up a private agency which would in many respects parallel the functions of such well-established activities as the Food and Drug Administration, Better Business Bureau, Advertising Federation of America, and through such duplication impose added and unnecessary burdens.

Some formidable facts are quoted in support of the contention that the American Medical Association probably did not appreciate the size of the undertaking, or it would not have attempted the task without setting up a schedule of fees payable for the service.

They quote that the 1929 Census of Manufactures shows nearly 50,000 plants engaged in manufacturing food products of one kind or other. Most of these un-

doubtedly have more than one product; many have more than one brand or label. There are nearly 6,000 wholesalers of food products, many of which market foods under their own label. Most of these market many staples under their private brand. In fact, according to a recent study, out of 306 wholesale grocers 63.4 per cent were marketing goods under private labels, and of those using private brands 61.1 per cent had over 50 private brand items in their line. Then there are over 1,000 corporations operating chains of food stores which use private labels to a greater or lesser degree. Furthermore, of nearly 600 voluntary chain systems now operating, many are developed almost entirely around the idea of retailing privately branded merchandise.

Obviously all of these products would have the right to demand American Medical Association testing, so as to enable them to receive fair consideration from the consuming public, along with nationally advertised products of the same kind.

On the basis of these figures it is contended that the American Medical Association would have to create a huge testing laboratory, employ hundreds of experts, if it intends to render efficient, competent, adequate, fairly prompt, impartial judgment on all the branded or advertised products that will have every right to receive their consideration.

The third question is uppermost in the minds of those who can readily see where the American Medical Association seal would be quickly and effectively capitalized by national advertisers. It would become an extremely deadly weapon in the extermination of small manufacturers, distributors of goods carrying private labels, who at present enjoy the public confidence in a limited market —perhaps only in a small territory. These feel that their application for approval, due to the comparatively limited facilities for testing now at the disposal of the committee on foods of the American Medical Association, probably would be long delayed, and that the large national advertisers would receive preferred consideration.

Smaller manufacturers and wholesalers hold that such an important and far-reaching undertaking, voluntarily assumed by a prominent national association of professional men, must anticipate fair and equitable operation on a national scale. For instance, all of the 3,873 manufacturers of flour and grain mill products, large or small; the 97 cereal manufacturers, and the wholesalers selling these products under private brands would expect examination, tests, and if warranted, permission to carry the American Medical Association seal, the same as those few in the group who do national advertising and have national distribution. They believe that if American Medical Association expects to continue and expand its present program, *public use of the label for advertising purposes in any particular food group should be prohibited until at least 80 per cent of the products in that group have been tested.*

Wholesalers believe that the American Medical Association is undertaking something entirely outside of its sphere when it goes beyond such measures as will eliminate unjustified claims by advertisers, and particularly that the "seal" idea will automatically result in discrimination against small producers of not nationally advertised goods. Among large producers and national advertisers opinion is divided.

Standard Brands, Inc., believes that "American Medical Association has no place in the picture; is assuming a job without an ample organization; is paralleling already existing, entirely dependable government and private agencies; is attempting to assert more judicial and regulatory powers than any private association should control."

General Foods Corp. "heartily approves the effort" and says "we have cooperated with this movement from its inception and shall continue to do so, in the belief that it is an important contribution to the cause of honesty in advertising."

While commenting on the magnitude of the task and taking it for granted that equitable administration is to be attempted, one manufacturer suggests that the American Medical Association will undoubtedly find it necessary to commercialize the activity if it is going to be continued.

The food industries can get a fair picture of what may develop out of this activity of the American Medical Association by studying the set-up maintained since 1901 by the National Board of Fire Underwriters.

The Underwriters Laboratories, Inc., tests appliances, devices, systems in respect to life, fire, collision hazards and the like. Its Chicago headquarters plant alone covers over 100,000 sq.ft. and is equipped with costly machinery and special apparatus to carry out the necessary tests. At Chicago a staff of over 200 employees is maintained. At the New York office over 80 are employed and over 100 engineers and inspectors are attached to the various state headquarters.

While no definite figures are published, it is understood that the Underwriters Laboratories average over 4,000 product tests annually, while over 80,000 inspections are made.

The cost of this service varies according to the nature of the product. Four major groups of examinations are scheduled as follows:

	Amount of Preliminary Fee	Total Cost to Applicant Not to Exceed
Group A	$100.00	$300.00
Group B	50.00	150.00
Group C	25.00	75.00
Group D	15.00	45.00

"These fees apply to only one examination and one set of tests on a single pattern . . ."

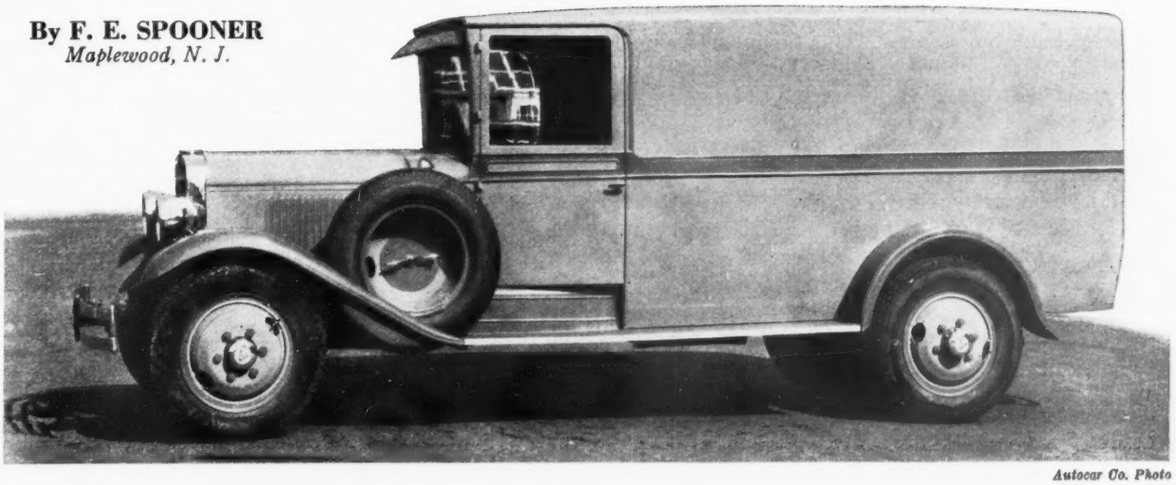
If the product is approved and permission is granted to carry the Underwriters label, one of the three types of "follow-up" services may be employed to apply to articles subsequently put out by the factory.

Under the re-examination service, the Laboratories obtain samples in the open market one or more times yearly and test them at the expense of the maker. The inspection service provides for regular and frequent inspection *at the factory* as well as of samples purchased in the open market, and its cost is billed monthly to the manufacturer of the product. The label service covers inspection of products at the factory, check tests on materials purchased in the open market and the like. Its cost is defrayed by charges made for the labels.

If attempts are to be made to use this set-up of the National Board of Fire Underwriters as a measuring stick for what may eventually develop out of the present effort of the American Medical Association, it must be remembered that there exists a great difference between the products involved. Contrary to the products with which the Underwriters Laboratories concerns itself, all of the products of the food industry are more or less perishable. In many cases possible impurities, adulterations, and the like can be discovered only after costly tests. Follow-up service would have to be more frequent and undoubtedly would prove more expensive.

Tire Care Brings Profit

By F. E. SPOONER
Maplewood, N. J.



Autocar Co. Photo

REGULAR inspection, preventive maintenance, and considerate treatment result in many additional miles of profitable tire use. Every year, however, tire neglect causes the loss of millions of miles of tire life and countless hours of time through delivery interruptions.

There is no need for this great loss, which probably would not amount to so high a figure were truck operators more conversant with their operating costs. With tires costing 1¼c. or more per mile, approximately one-twelfth to one-fifteenth of the total operating cost, it is patent that this particular item warrants close attention.

The penalty of improper tire service is severe, directly and indirectly: first from premature failure, which lessens the average tire mileage, necessitates frequent replacements, and results in increased operating expense; second, and in most cases a cost item of greater consequence than the first, delivery interruptions.

A routine for the proper care of the tires involves the following: first, equip the truck with the proper size of tires; second, instruct the drivers to be careful while driving, that is, to favor the tires; and third, arrange to have the tires inspected and serviced regularly.

Loading a tire beyond its rated capacity may cause overstressing by heavy inflation or excessive flexing of the side walls and distortion of the tread. Sooner or later, this misuse will result in broken fabric, rapid and spotty tread wear, tread and ply separation, and finally in complete failure of the tire.

All of the foregoing precautions go for naught, however, unless the full cooperation of the driver is obtained. He must add his bit through proper treatment of the tires, and once convinced of the importance of avoiding certain abuses, he can help definitely in cutting down costs. His duties involve the following:

1. Avoid jamming tires against curbs or into holes.
2. Avoid scraping against curbs and obstructions.
3. Avoid spinning and locking wheels when accelerating and slowing down.
4. Attend to underinflated tires promptly.
5. Replace valve caps after inflation and keep clean.
6. See that anti-skid chains are not attached too tight.
7. Remove immediately obstacles wedged between dual tires.
8. Refuse to operate on a flat.

Beware the careless driver whose tires are overinflated at one time and underinflated at another; who constantly drives at excessive speeds on the open road and cares little for the abrasion, slipping, and spinning caused by going over avoidable rough roads; who uses his four-wheel brakes to the limit and leaves tire marks representing hundreds of miles of rubber on the road; who jams the accelerator to the floor and jumps the vehicle away at the start; who takes turns at high rates of speed; who applies antiskid chains too tight, causing treads to be gouged by cross-links; and who ruins tires and tubes by running on flats.

The third step in tire preservation is proper servicing. This question involves deciding who is going to do the work; i.e., can the operator do it himself economically or should he use outside facilities?

Such a service involves a wide range of duties; namely, regular checking of tire pressures, condition inspection, and prompt attention to defects.

Under the foregoing must be included attention to leaky valves, tight rims, rim bruises, deep cuts, small cuts, tread wear, wheel wobble, misalignment, faulty brakes, removal of abrasives, spot repairs, and sectional repairs.

The chief factor in the life of any pneumatic tire is the air contained within the tube. It is the air that carries the load, not the carcass. Consequently, the quantity of air must always be sufficient to carry the load and permit the tire to perform its natural function. Otherwise the tire will fail from flexing breaks, excessive tread wear, carcass rupture, tread separation, rim cuts, and rim bruises.

Tire makers furnish pressure charts and these should always be followed.

The alert inspector will also tighten nuts at the base of valves, and valve cores. He will always apply valve caps and screw them tightly, as they aid in retaining air and prevent dust and mud from getting into the valve and under the valve seat. He will also see that the locknut on the valve stem is screwed down tight to prevent a tube from being ruined when a tire goes flat by the valve being pulled inside the casing.

Care should be exercised in mounting dual disk wheels

to make sure that hand holes line up to admit of ready inflation from the front.

Tire trouble may be traced also to rim ailments. Bent and rusty rims, for example, often prove expensive. When a flange has a bent spot the bead of the tire is not properly supported and air pressure from within causes a bulge in the tire. This bulge causes chafing of the bead covering whenever this portion of the tire comes in contact with the road, ultimately weakening the bead and causing tire failure. Generally it is possible to straighten rim flanges with a hammer, but if rims are in such a bad condition that they cannot be fixed they should be replaced with new ones.

Rusty rims cause damage to beads and should be cleaned at each demounting to prevent erosion and rust accumulation. Old rims should be buffed and painted with aluminum or graphite paint before new tires are applied. Such care reduces another form of bead chafing and eventual rim cuts, and the possibility of tires freezing to the rim, causing need of excessive and injurious force in mounting and demounting.

Studs or lugs should be tight; loose lugs not only induce elongation of stud holes, promoting uneven tire wear, but bring with them all the other dangers of a loose rim.

Use of standard rims with oversize tires is not uncommon and is a practice that cuts into tire life. The narrow width of such rims causes the beads to be drawn closer together than normal, with the result that only the heel of the bead contacts the rim face and flexing at the side wall occurs at a point not designed to assume this function.

When overside dual tires are used, it is necessary that sufficient spacing be provided between the tires. Otherwise, rubbing on the inside occurs and causes loose tread at the shoulders and as a result premature failure.

Injurious chafing of the bead is caused by split rims improperly joined because of battered condition. When locked, split rims should line up and close within certain definite limits. The standard established is $\frac{1}{64}$ in. for alignment and $\frac{1}{16}$ in. for closing.

Rim bruise from underinflation is most harmful. It is caused by the tire hitting an obstacle with sufficient force to drive the tire up against the rim. The tread and side-wall rubber, being very tough, seldom show where the tire came in contact with the object. A tire injured in this way rarely fails at once. It may run for many miles and then go suddenly flat on a smooth roadway or while the truck is standing still.

Tread cuts in casings allow moisture and dirt to get to the breaker strip. The flexing action of the tire enlarges the cut and the foreign matter tends to loosen the fabric from the tread, weakening and rotting the carcass and eventually causing blowouts. The remedy is an inexpensive spot repair, which is simply a sealing of the incision with rubber. The well-known "sand blister" frequently reveals neglected tread cuts.

Blow-patches or removable boots should be used only for an emergency until such time as a permanent repair can be made. It is a waste of money to delay replacing these emergency units, for in a short time they chafe the inside of the tire beyond repair.

Wheel misalignment causes rapid wear as will a wobbly wheel. A dragging brake, in addition to increasing brake expense, causes one tire to work more and wear faster than the other. Heat generation that sets in from a faulty brake causes bead and carcass deterioration.

Long tire life can be traced to clean floors rid of oil and grease, which attack the rubber.

Coming back to the question of who is to furnish servicing, it might be stated that unless an operator is large and can keep personnel and equipment busy, such a service can be secured to better financial advantage from a tire service station or from truck dealers or branches set up for such service. This applies particularly to fleets of ten units and under.

Chuck holes are the finish of many a good tire

Using the Vacuum Pan In Preserve Manufacture

By WILLIAM F. ROBERTSON
Teaneck, N. J.

THE strawberry is prized primarily for its aromatic qualities, and every effort is made in manufacturing to preserve these qualities. Formerly (and of course today by the housewife) strawberries were handled in 2- and 3-lb. lots, in order to preserve the delicate color, mild acidity, and delightful aroma. For obvious reasons, commercial manufacturers have abandoned this procedure as being extremely expensive.

Strawberries are grown over most of the area of the United States; but in the more thickly populated areas, the points of greatest consumption, the demand is so great for fresh berries in season that their cost is too great for manufacturing purposes. This economic condition has led various individuals to endeavor to procure berries from a distance and simulate local-grown berries by the use of reduced temperature—first, by simply cooling the berries; second, by freezing them solid; and third, by packing them with varying quantities of sugar in large containers and then freezing.

Beyond a doubt the latter method is the most economical and also the best. A strawberry contains about 95 per cent water, and in the presence of sugar gives up a considerable proportion of this moisture. The result of this action is a slight shrinking of the berry and consequently a toughening which results in a better berry for manufacturing and, unless the storage period is prolonged beyond reason, it retains the qualities for which a strawberry is noted.

This method of preserving strawberries is called "cold-pack." Berries from the field are capped, washed (and sometimes graded for size), and mixed with sugar, usually 2 lb. of fruit to 1 lb. of sugar, but sometimes 3, 4, and even 5 lb. of berries to a pound of sugar; placed in barrels and removed as soon as expedient to cold storage at or near the freezing point for several days and then stored at a temperature of 15 to 18 deg. F. This temperature does not freeze the mixture of berries and sugar solid but often gives a large lump of frozen fruit in the middle of the barrel or puts large quantities of flake ice among the fruit. As would be expected, it is the water that actually freezes and not the sugar or fruit. The small cells of the fruit, which are more or less filled with water, then will freeze, and this produces a tendency to disrupt the cells.

When fruit is to be used for manufacturing the thawing process should be as slow as is practicable, because of the expanding of ice on thawing as well as when freezing. The first expansion is severe enough, but cannot be helped, whereas the second can be practically eliminated by a slow thawing. Berries, then, should be placed at a temperature of 30 to 34 deg. F. for seven to ten days before using. This temperature will remove all the ice without allowing any fermentation or causing any serious damage from broken cells caused by rapid thawing.

It has been found by experimental work with strawberries that the actual berry does not take up any sugar in the normal storage period. If this is so, the manufacturer of preserves or any other product with strawberries must make first a sugar syrup and then impregnate the fruit with this syrup.

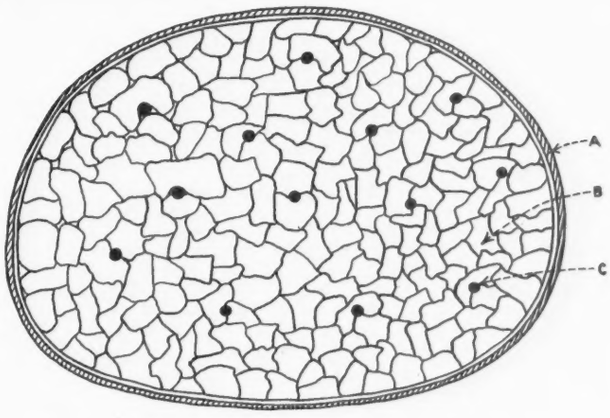


Fig. 1—A theoretical fruit. A—Epidermal cell structure; small cells, compact, usually tough and known as "skin." B—Fleshy cells, often called meat. C—Fibers, string, coarse fibers

In the past this process has been simply the mixing of the juice that is drawn from the barrels of fruit; that is, sugar, water, a little color and flavor, with the required amount of sugar, boiling it to a temperature of about 223 deg. F. and then adding the fruit and again boiling to 221 deg. F. (perhaps 220 or 222 deg. F.), and allowing to cool to about 100 deg. F. This process gave strawberry preserves with some whole fruit but often with a dark color and sometimes a caramel flavor. The darkening of the fruit and juice tends to make the seeds more prominent and thus objectionable.

The more modern method is to do the same thing except under reduced pressure or partial vacuum. The vacuum, besides allowing this process to go on at a greatly reduced temperature (140 to 145 deg. F.), actually has a tendency to create an internal pressure within the berry, or a sort of blowing up from within. By the simple expedient of making and breaking the vacuum the berry alternately is puffed up and flattened as it lies within the juice, thus helping the process. The result is a brighter colored product possessing the delectable aromatic qualities for which this fruit is prized.

The intent of this article is to present in understandable fashion the making of preserves in a vacuum pan. To accomplish this purpose many digressions must be made from simply formulary instructions. These byways all have a bearing on general preserve manufacture and on the reduced-pressure method in particular.

A general knowledge of fruits and fruit structure must be uppermost in the mind of the manufacturer. It is possible to throw fruit and sugar into a kettle and by simply applying heat produce a preserve of sorts. The individual who has a working knowledge of fruits and fruit structures, however, will produce a finer product and for less expenditure of capital than another who

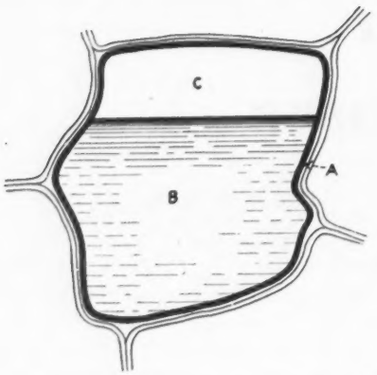


Fig. 2—A theoretical fruit cell. A—Cell wall, membrane of permeable or semi-permeable nature; i.e., may allow liquid to pass into liquid of greater density, or may allow liquid to pass out of cell. B—Cell liquid, mostly water, usually containing plant food, color, sugar, minerals, etc. C—Cell gas, mostly air

blindly follows a given set of instructions whether in an open kettle or under vacuum.

Without delving too deeply into botany, a working concept of a fruit may be developed by a study of the accompanying sketch, Fig. 1. This sketch, made without the hand of an artist or the knowledge of a physiologist, shows a theoretical fruit. Without detail are shown an epidermal cell structure, or skin; a fleshy portion called meat; and, as in most fruits, some kind of fibers.

With similar exactness, Fig. 2 shows a single theoretical cell: a cell wall of permeable, or semi-permeable, nature may allow liquid of a density greater than that within the cell to pass into it; may allow the thin liquid within the cell to pass out of it, or both; a cell liquid, mostly composed of water, but containing also plant food, minerals, color, sugar, etc.; a cell gas which is mostly air.

A study of these two drawings shows that there is a similarity in all fruit processes, but it must be kept in mind that specific fruits and special products require certain definite procedure. A working knowledge of the materials at hand from nature is shown. Obviously if the cell is heated rapidly it will explode and destroy the characteristic of the fruit; if frozen, the cell first follows the contraction of its contents and then is liable to be torn by the expansion of crystal formation as the liquid freezes.

If the cell is placed in a strong sugar syrup it will rapidly lose water and collapse. The extent of this collapse is important, because if action is very rapid, the cell walls may be destroyed and will never return to normal again; but a mild shrinkage or collapse is desirable, in order to toughen fruits to withstand cooking.

To build up the entire list of fruits in this theoretical fashion would be tiresome as well as of no real value. However, certain fruits, because of their importance in preserve making, should be considered.

A theoretical strawberry is shown in Fig. 3. Note that the strawberry seed is small and not desirable, but that the fleshy stem is the delicious part. The ideal manufacturing strawberry would have a comparatively tough epidermal cell structure, a small hull scar, strong seed fibers, solid core, and colored to the center. Such a strawberry is not available, so manipulation to hold the best thing to hand in proper shape and condition is desirable.

A theoretical raspberry is shown in Fig. 4. Note the entirely different construction. This fruit is made up of many small fruits, each one complete in itself—a drupe like a cherry or plum. Each section has a skin, a fleshy part, a seed, and a small scar where fruit was attached to the stem before it was picked.

The process of manufacture then is the addition of sugar for palatability, and cooking to render more desirable and to aid in preservation. The fruit must be of the same density as the syrup around it when packed or it will float before it can reach that condition by standing. The complete process of preserving must be accomplished before packing. This is the complete problem: the fruit must be whole or in the condition commonly accepted; the fruit must contain as much sugar as the syrup; the whole job must be done without destroying the cell structure; the color should be pleasing and characteristic; the flavor should be characteristic and predominant. In modern manufacture with all this must come speed.

The vacuum pan as a piece of preserving equipment has become of prime importance to high-quality packers competing in the present market. From the above it will be seen that the procedure in any method is one of osmosis. Quoting from Ganong: "Osmosis is a physical process and occurs whenever two solutions of different strengths are separated by a membrane that can be wet; that in such case there is always a movement from the weaker to the stronger solution; that the movement involves both solvent and dissolved substance in case of permeable membranes, but the solvent only in the semi-permeable kind; that the stronger solution will swell and rise if free, but when confined will develop pressure which can become very great. Also its rate is directly proportional to temperature.

" . . . When tender tissues are immersed in a solution having a greater osmotic strength than the sap —movement out—the result is always a collapse of the tissues (more striking than wilting produces)." This pressure may be so great as to even break the fruit. "Invert sugar, weight for weight, exerts twice the osmotic pressure of cane sugar."

Manufacturing under vacuum is not magic nor is it so complicated that the average person cannot master it. Everything that goes on in an open kettle and cooling pan goes on within a vacuum pan. The fruit of today is cold-packed and therefore partly shrunken and toughened before use. The vacuum pan may take three barrels of $2+1$ fruit at a time and produce high-quality preserves from them in an hour. The work is accomplished at a temperature of about 145 deg. F. and therefore gives a bright characteristic color, because the color is not affected by the presence of caramelized sugar. The flavor is very desirable because at this lowered temperature many of the flavoring elements are not volatilized. The fruit does not float because the osmosis is complete and not with such speed as to destroy the cell walls. The sugar has its maximum preserving power and sweetening quality because the minimum inversion has taken place.

Because strawberries probably are the leader in preserve sales a formula for their manufacture is contained in this article. Other fruits, with minor differences, follow a similar outline.

The batch consists of three barrels of strawberries, sugar to make a 45—55 preserve (and pectin, if used). Three barrels of $2+1$ strawberries with a legal net weight of 450 lb. contain 300 lb. of strawberries and 150 lb. of sugar each. The three barrels, then, are the equivalent of twenty 45-lb. lots of berries and require 1,100 lb. of sugar. As the three barrels of fruit already contains 450 lb. of sugar, the balance of 750 lb. must

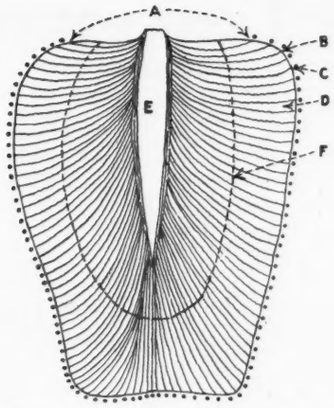


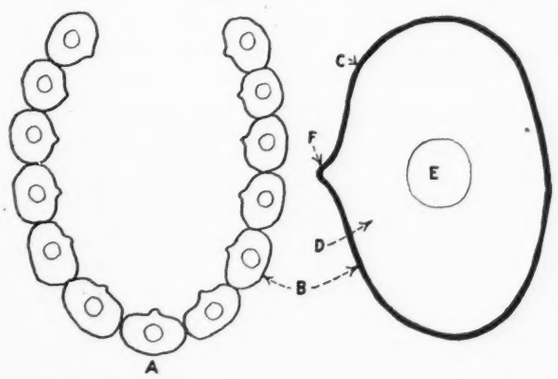
Fig. 3—A theoretical section of strawberry. A—Scar where hull was removed. B—Epidermal cell structure; skinlike covering, very tender. C—Seeds, outside of skin, one attached to end of each fiber. D—Fleshy cells; very soft and tender. E—Often a hole in center; not desirable. F—Often inside of dotted line is white or very pale pink; not desirable

be added. A high-grade preserve can be made with less sugar if desired. There is no need of hedging on the pectin situation; practically all preserve makers use a small quantity of pectin in fruits which contain little or no pectin, and the strawberry is one of these. If dry pectin is used it should first be incorporated with part of the sugar and then mixed with cold water.

Taking three barrels of strawberries (2 + 1), remove the heads from the barrels and separate the fruit from the juice; put the juice into a preheater or vacuum pan and dissolve the sugar in it. If dry pectin is used 9 lb. of a No. 40 grade should be used; if liquid pectin, about 20 lb. should be mixed with the juice. If a preheater is used, as soon as the sugar is dissolved place it in a vacuum pan and concentrate to 36 on a Baumé scale or 69 on the sugar scale of a refractometer. In order to prevent excessive breaking, strawberries must be introduced through the door of a vacuum pan; most other fruits may be taken into the pan by vacuum. If a preheater is used, berries may be put into it and the juice from the pan allowed to flow back over the berries and then the entire lot taken back with a vacuum gage at about 10 in.

Everything being in the pan, a vacuum should be drawn as high and rapidly as possible and the berries given a good roll. This coats every berry with syrup and

Fig. 4—A theoretical section of raspberry. A—Raspberry cross-section after being picked. B—Drupe; raspberry is made up of many small fruits, each one an individual like a cherry or peach. C—Skin. D—Fleshy cells. E—Seed. F—Connection of drupe to stem before berry was picked



heats it through. The admission of air at this point until the fruit is at atmospheric pressure, and heated to 140–145 deg. F., allows osmosis to go on very rapidly. Everything now is ready to finish. Develop a vacuum as near 29 in. as is possible, apply heat so that concentration takes about 15 min., and test for finish point.

On the Baumé scale at 140 deg. F., the finish is about 34, or, on a refractometer sugar scale, 68. This point is a little delicate and should be watched carefully until the operator becomes skilled. If osmosis is not complete, the fruit will float and yet the finish point apparently will have been reached. This is caused by excessive speed in concentration and can be eliminated only by a knowledge of fruit. Osmosis continues to go on and a second reading of finish point will show lower than that at which concentration was stopped. To start the pan again at this point probably will break all berries to pieces, so care should be exercised that this point is not reached too quickly.

If the above difficulty has been encountered, the second lot of berries should be allowed to stand for 5 min. after the first roll, again given a roll, and then allowed to stand at atmospheric pressure for 2 or 3 min. This usually completes the osmosis and gives a true reading of finish point.

The above procedure results in 1,700 to 1,750 lb. of finished preserves (determined by end point), ready for filling machines.

To get the best results from the vacuum pan there should be a receptacle equipped with slow agitation, large enough to take the entire batch and perhaps half of another, so that operation will not be hindered by having fillers idle while the pan is working and the pan idle while fillers are working.

▼ ▼

Quality in Canned Peas

RECENT findings of specialists at the New York State Agricultural Experiment Station at Geneva on the factors that affect the quality of canned peas are proving of interest to the trade and to growers alike, in view of the concerted effort made by the canning industry to insure a uniform quality of pack. Probably the chief contribution of the station workers in this connection is the determination of the factors that cause hard peas and the development of a method whereby the quality of peas can be determined in the field. Experimental attempts were made to affect the quality of peas by changing fertilizer applications. It was found that only minor differences could be brought about by this means when the peas were harvested at the same stage of growth, indicating that timely harvesting was the most important factor involved in determining the quality of the canned product. With this fact in mind the station workers have developed a quality index, determined mechanically, which they believe will make possible the harvesting of peas at their best for canning.

In summarizing, they say in part: "With a soil and climate generally suited to peas, the grower can fertilize for quantity, and quality will take care of itself. It would be a safe precaution to use abundant potassium, as this would tend to lessen the absorption of calcium, which makes tough peas. It is important that a more accurate way than the present inspection method of judging the time of harvesting be devised, because peas under any condition of growth will become tough if their field life is unduly prolonged."

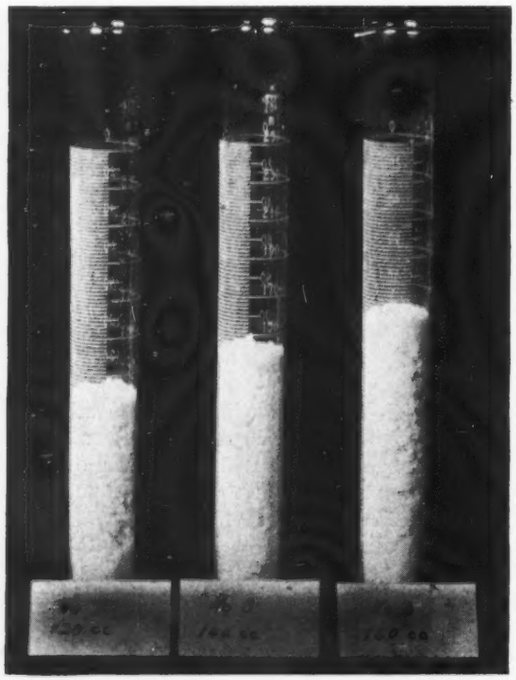
Watery Whites Do Not Lessen Egg Value

By J. L. ST. JOHN
Division of Chemistry
Agricultural Experiment Station
Pullman, Wash.

IS THERE justification for the opinion that eggs with "watery whites" are undesirable? It appears that some have the opinion that eggs with a watery white do not whip and poach as satisfactorily as those with firm whites. Possibly this is because it is believed that a watery white indicates a storage egg, which is thought to be undesirable for whipping and poaching. In the terminal markets, eggs which are thought to be watery probably are identified almost entirely by candling. A question may be raised regarding the ability of the ordinary candling process to distinguish between eggs with watery whites and those with firm whites. In this paper are presented briefly the results of an actual comparative study of firm white and watery white when used for whipping and for poaching.

The difference in volume of the beaten white from firm and from watery whites is shown in Fig. 1. Firm eggs were classified as No. 1, while watery eggs were classified as No. 5. Intermediate grades of firmness were classified as No. 2, 3, or 4. It is evident from Fig. 1 that white of watery eggs gave a decidedly larger volume on whipping than white from firm eggs. In each case the volume represented is that obtained from 30 gm. of white and the volumes represented are the average results of several trials. In addition to the differences in volume, the beaten white of the watery eggs had a fluffy, glistening appearance and the air cells were comparatively large, while in the white from the firm eggs the air cells were smaller and the beaten white had a pasty appearance and was less fluffy.

Fig. 1—Difference in volume of beaten whites from eggs with firm (No. 1), intermediate (No. 3), and watery (No. 5) whites, quantity beaten being 30 gm. in each case



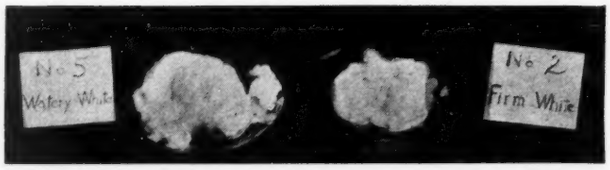


Fig. 2—Difference in volume of the beaten white of two individual eggs

The difference in the volume of the beaten white of two individual eggs is shown in Fig. 2. In this instance all of the white was used. The contrast is even more striking when we learn that the weight of watery white represented in Fig. 2 is 32.5 gm., while the weight of the firm white was 34 gm.

The effect of storage at low temperatures on the volume of the beaten white is shown in Fig. 3 and it appears that even two years' storage has comparatively little effect on the volume. Results for intermediate lengths of storage, not shown in the figure, were practically the same. These results are for No. 5, or watery, eggs. The volume after two years was almost identical with that of fresh eggs whipped the day they were laid. Formulas sometimes specify that eggs for angel food cake should be fresh but at least three days old. It would appear that it is not in reality the age of the egg that is important; but the relative firmness would appear to be the controlling factor, since it was found that No. 5 fresh eggs beat about as well as seven-day-old No. 5s.

Those who have observed closely know that egg white is made up of two parts, one thick and one thin. To study any relation which this might have to the results reported above, a large number of whites from eggs of differing firmness were separated into the two parts and 10 gm. of each was beaten separately. Fig. 4 summarizes these results. It is evident first that the thin portion of the egg gives a decidedly greater volume than the thick portion. It also is apparent that there is comparatively little difference in the volume between firm and watery eggs when we consider the thin portion of the white, although the tendency may be toward a greater volume of the thin portion from more watery eggs. Considering the thick portion, we note an appreciable increase in the volume of the watery eggs over those with a firm white. This correlates with the results on unseparated white, where greater volume was obtained from the thinner watery eggs than from the firm eggs. Separating the thick and thin portions of storage eggs showed no appreciable change in the volume of the thin portion due to storage, while there was an increase in the volume of thick white during storage, except after two years. The thick white available after this length of time probably was a small residue the colloidal structure of which was more stable than the rest of the thick. The results on unseparated white, illustrated in Fig. 3, show that the influence of this two-year residue is almost negligible.

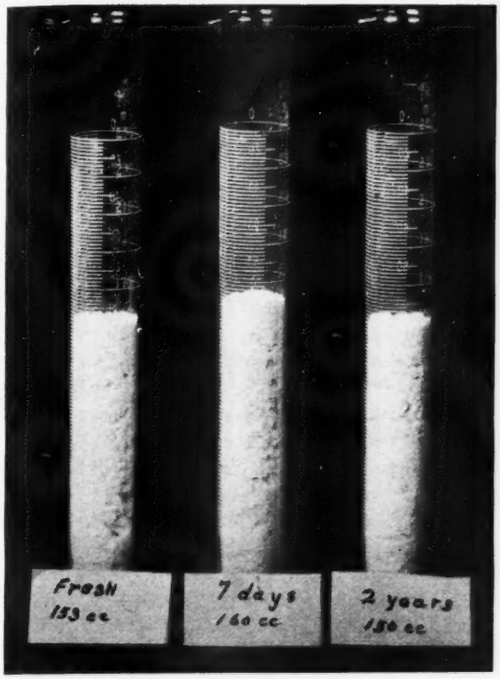


Fig. 3—Effect of cold storage on the volume of beaten egg whites

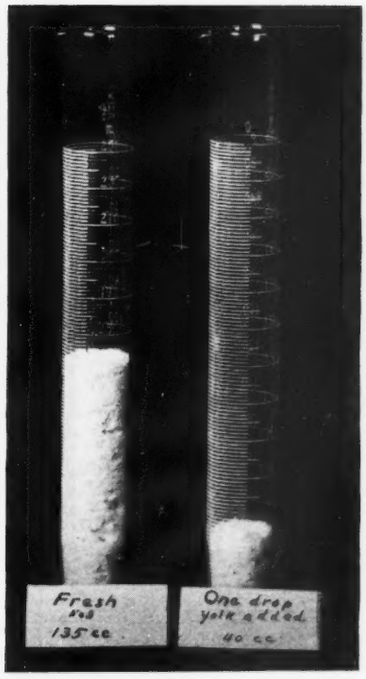


Fig. 6—Small quantities of yolk decrease the volume of beaten white

Another point of interest which is contrary to the opinion held by many people relates to the effect of temperature on the volume of the beaten white. Fig. 5 shows that beating at ice-box temperature is detrimental rather than beneficial and that raising the temperature above room temperature is slightly beneficial to the volume, although other considerations probably make it advisable to beat the white at room temperature, 21 deg. C. Care should be taken to insure that eggs are taken from the cold room long enough before whipping to allow them to come to room temperature.

Another point of practical interest is illustrated in Fig. 6. The only difference between the treatment of the white shown in these two cylinders was the addition of one drop of egg yolk before whipping to the white showing the smaller volume. This one drop of yolk reduced the volume of the beaten white from 135 down to 40 cc. This emphasizes the fact that only clean utensils free from any trace of materials such as butter, milk, cream, yolk, or other material containing fat should be used for the whipping of egg white.

The results of the study of poaching are difficult to express in quantitative terms, although the results are definite. It was found that the thin-white, or watery, eggs could be as satisfactorily poached as the thick-white, or firm, eggs, if there was added to the water in which the poaching was done three-fourths of a teaspoonful of common salt for each pint of water used. This is a simple and practical expedient for home use, which should probably be used whenever eggs are poached, independently of the condition or quality of the eggs.

The results are presented much more fully by St. John and Flor in *Poultry Science* 10 (1931), 71. This work is being extended to include a study of the application of these results to the baking of angel food cake.

How is it possible to incorporate air into a fluid substance such as egg white and produce a material which is less fluid than either the air or the egg white? We know that this can be done during the process of whipping egg white. The foam formed is a colloidal sol of air in the white, belonging to the gas-in-liquid type of sol. Ordinarily a high viscosity and a low surface tension of a sol contribute toward the formation of foams. In a sol the solute tends to collect at the surface, being adsorbed there because it lowers surface tension, which in turn lowers the free surface energy, a condition toward which all systems tend.

To obtain a foam it is essential that there shall be a distinct surface film. Agitation serves to increase the amount of free surface. The whipping of egg white—shearing force—tears the white into portions and carries air into the body of the sol. Under the influence of surface tension the particles of white form drops which have a minimum of surface area per unit of material, since a sphere has this minimum surface area for a given volume. Many of these drops are spherical films inclosing air. The viscosity of the white resists the thinning of the liquid films to a point where they would rupture. A continuation of the whipping tears the particles into others smaller and still smaller with the formation of a sol of gas in liquid with progressively smaller droplets. This is accompanied by a progressive decrease in fluidity in conformity with the known effect of the size of particles on viscosity. Thus the rather surprising result obtained during the whipping of egg white seems to conform to the laws governing the relation of surface tension and viscosity to colloidal systems which have been subjected to one type of shearing stress.

Fig. 4—The thin part of an egg white beats to greater volume than the thick part

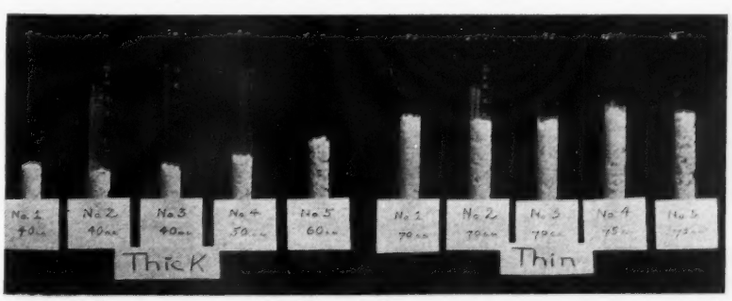


Fig. 5—When beaten cold, a smaller volume is obtained than at room temperature

What the English Housewife Thinks of American Foods

By ALBERT HARING

Lehigh University
Bethlehem, Pa.

A BRITISH market survey of peculiar interest to American manufacturers was conducted during June, 1930, by W. N. Coglan, director, Sales Research Services, London, England. This survey was made as one step in obtaining a correct knowledge of present British market conditions. It was completed previous to the Empire conference on trade held during October, and the housewives were not influenced in their expressions by the publicity attendant upon that meeting.

One thousand housewives, divided equally between the middle and the lower middle classes, were interviewed for the purpose of ascertaining their preferences with respect to British, Empire, American, and foreign merchandise. The survey applies particularly to foodstuffs and grocery-store items, and the data give an interesting cross-section of the present-day attitude of typical British women shoppers toward American merchandise.

A careful attempt was made to measure the proportion of women who deliberately purchased British and Empire goods, and the reasons for their preference. The thousand interviews were scattered widely in the cities of London (400), Bristol (100), Birmingham (200), Manchester (200), and Glasgow (100). The reports from the various cities were surprisingly consistent, although the preference for Empire goods was weaker in Manchester than in the others.

The following basic points were covered in the interviews:

1. (a) Does the purchaser definitely *ask* for Empire products (foodstuffs)?
   (b) What considerations urge her to do so?
   (c) If she does not, what are her reasons?
2. Does the shopper definitely look for or ask for the "British Made" mark when buying household, toilet, and general utility goods?
3. If a British-made article is somewhat dearer than a foreign article of *similar* quality, which does she buy?
4. To what extent does the dealer push Empire products?
5. What is the attitude toward goods of American origin—does she regard them as "foreign"?

Preference for Empire Foodstuffs

Of the 1,000 housewives interviewed, 49.1 per cent, or approximately half of them, claimed that they definitely stipulate Empire products when purchasing foodstuffs. "Indefinite buyers," or women who only occasionally ask for Empire foodstuffs, amounted to 24.1 per cent of the total. The remaining 26.8 per cent stated that they never deliberately ask for Empire products. To the north and west, away from London, the appeal of Empire foodstuffs, apparently was weaker, while middle-class housewives were found to request Empire products more frequently than women of the poorer homes.

Of the 491 housewives who stated that they are in the habit of demanding Empire foodstuffs, 64.5 per cent claimed that they did so from patriotic motives. Only 26.3 per cent of them mentioned the quality of Empire products, and 15.5 per cent laid their preference to custom. Interesting to note, 14 per cent of these women declared that they purchased Empire goods because such buying tends to lessen the business depression in England. Finally, 3.5 per cent stated that advertising caused them to buy Empire foodstuffs. (These percentages and some of those which follow total over 100 because a number of women gave more than one reason.)

Patriotism was more important among women of the middle class, while housewives of the poorer class were more concerned with quality and the effect of their purchases upon the business depression in their country.

Reasons for Non-Purchase of Empire Foodstuffs

Indifference was the main reason for the non-purchase of Empire products, and 256, or 50.3 per cent, of the 509 women who did not regularly stipulate Empire foodstuffs were reported as answering the question in this manner. The prices of Empire products were considered too high by 29.5 per cent of this group; 13.5 per cent preferred a "free hand" in purchasing; and 10.4 per cent stated that they could not always obtain Empire foodstuffs.

Among the 150 women who definitely stated that they considered Empire products "too dear," such expressions as the following were common: "Cannot afford to buy Empire goods [illegible]mily"; "always buy for value"; "better value in other goods"; "not always possible to buy at their high prices"; "getting tired of all the talk; why don't they make them cheaper." It appears that the British housewives, as a whole, consider the retail prices of Empire foodstuffs too high, and it is likely that many of the answers classified under other headings would further strengthen this view if the women had been able and willing to analyze their attitudes more thoroughly. "Prefer to have a free hand" and "do not care to be tied down" were common answers which indicate a price objection to Empire goods. This would seem to be a decisive factor, since 653, or almost two-thirds, of the women stated that, the qualities of both articles being similar, they would not purchase British-made articles if they were somewhat more expensive than their foreign-made competitors.

A few of the remarks made by the women respondents are reproduced verbatim because they appear significant:

"Prices of British goods are too dear for a large family. Foreign-made articles wear just as well."

"Compare the price of British toys—twice that of the foreign ones."

"If only the prices of our own produce would come down, I feel sure everybody would buy British only."

"My husband is very keen on buying Empire goods, but I have to plan out the money."

"I cannot afford English eggs, bacon, or butter in the winter."

"The difference between English and foreign goods in price is too great."

The "Made in Britain" Mark on Other Goods

In the purchase of household goods, kitchen utensils, and other equipment, the proportion of women who demanded the "Made in Britain" mark was about the same, roughly one-half, as in the case of Empire foodstuffs. This correlation might be expected, but it indicates that the responses give facts of rather broad application. Many women also mentioned an inability to obtain British merchandise of various types, in addition to objecting to the high prices of British merchandise in many cases. Remarks such as the following were frequently received: "Cannot afford to buy British glass"; "British enamel pans are too dear"; "I wanted to buy a British clock, but couldn't find any."

The survey summarizes the situation: "The question arises as to how far a better and more widely spread knowledge of the good quality of British goods would serve to counteract the price appeal of the foreign articles."

Goods of American Origin

An attempt was made to determine whether or not British housewives considered American goods as "foreign." The report of the survey is quoted on this:

"The investigation shows that the mass of women interviewed were not at all critical in the matter. In short, they were quite neutral and had no objection to American goods as such. This neutrality is not to be interpreted as indifference nor yet as a prejudiced attitude. It means that these women are quite prepared to purchase American goods that suit their needs as to quality, price, etc., without being conscious of any inherent objection because they happen to be American goods."

Out of the 1,000 women interviewed, 216, or 21.6 per cent, definitely averred their objections to American goods. Of this group, 110, or over one-half, indicated that they had an objection to Americans generally, an antipathy which they transferred to American merchandise. This prejudice finds a definite expression in statements such as: "Oh, the Americans always seem to claim everything"; "I loathe everything American"; "they are only noisy money grabbers."

Of the remaining women who objected to American goods, 62 felt that the market was being flooded with American commodities, which ought not to be purchased because a British citizen has a duty to help British trade; 36 regarded American articles as "foreign" merchandise which should be passed over for patriotic reasons; and 8 regarded American goods as "inferior and of cheap quality."

"So far as the incidence of this antipathy is concerned territorially, it is greatest in Birmingham and at its lowest ebb in Manchester, but it is interesting to note that, as between the two classes interviewed, it is the better class housewives who indicate this dislike to the greater extent."

Only 40, or 4 per cent, of the housewives interviewed definitely declared that they liked goods originating in the United States. The principal reason for this preference was found to be the excellent quality of the canned foods. No fewer than fifteen housewives considered that "American tinned fruits cannot be beaten."

"It is evident," the report states, "that these expressions for American goods are due to the leadership of certain well advertised and well established brands of foodstuffs, household, and toilet goods which have found general acceptance in the British market and of which our informants were habitual purchasers."

Dealer Attitude

The statements from housewives indicated that the great majority of English retailers are making no serious attempt to persuade customers to purchase British and Empire goods rather than articles originating elsewhere. The dealer attitude was one of neutrality—let the customer choose. In fact, 801, or approximately four-fifths, of the women interviewed stated that dealers made no apparent effort to encourage them to purchase British or Empire goods. The few dealers who did push Empire and British merchandise catered to the better class of trade. In addition, two Birmingham women reported that their dealer had encouraged them to buy foreign rather than British merchandise.

The facts contained in the report of the survey made by Mr. Coglan's organization have been presented without comment. From these data, however, the opportunity for high-quality, fairly priced American goods would seem to be excellent in Great Britain at the present time. For articles that are backed by aggressive merchandising and advertising methods, this would seem to be particularly true.

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Foreign and Domestic Egg Standards

EGG quality standards are now recognized in eighteen countries, including the United States. Of the seventeen foreign countries under consideration, fifteen maintain standards in connection with export trade in eggs, and two, Germany and the United Kingdom, recognize standards for the domestic trade only, since neither of those countries is an extensive egg exporter. In spite of the natural differences which have developed in the drawing up of egg quality standards in various countries, there is a uniformity of method and a considerable uniformity in the actual standards themselves.

Both Canadian and United States standards for egg quality have influenced those which have been formulated by other countries. Canada was the first country to formulate egg standards systematically, later followed by the United States, which adapted standards closely resembling those of the Dominion in most essential respects.

Examination of the standards of the other countries shows that, in general, not only have the same quality factors been considered in their formation, but also the same methods of describing degrees of quality for these different factors have been followed. For example, in practically all of the standards, the specifications for the air cell deal with the depth of the cell. Similarly, differences in quality as evidenced by the condition of the yolk are indicated in terms of visibility of the yolk, and specifications for the shell are determined by the physical condition of the shell.

Foreign Crops and Markets, Vol. 22, No. 22, issued by the Bureau of Agricultural Economics, U. S. Department of Agriculture, contains descriptions of the egg standards in all countries in which such standards are now recognized.

Quick-Freezing Raises Quality Of Plastic Foods

By CLARENCE W. VOGT
Vice-President, Vogt Processes, Inc.
Louisville, Ky.

ATTEMPTS to apply modern "quick-freezing" methods to the processing of such plastic foods as ice cream, lard, and margarine have brought realization that the barrel, drum, and tub, so long associated with the processing of these products, are not adequate to give the desired results.

In the preparation of ice cream, lard substitutes, and margarine several points of similarity exist. For example, it is desirable that crystallization be effected in a manner to prevent perceptible separation of the emulsified or mixed ingredients; it should be brought about rapidly, so that the resulting product will be smooth and not grainy.

In the case of the ice cream and lard compound, air or other gaseous ingredients are required, but for different reasons. The gaseous ingredient is whipped into ice cream to make the product palatable instead of soggy. It is present in lard compound to increase the whiteness or opacity of the product.

In spite of the similarity of requirements, it is interesting to note that these products have been processed in radically different types of apparatus. This is brought out clearly in four articles appearing in the May, 1931, issue of FOOD INDUSTRIES (Bayer, A. H., page 182, "Proper Application of Refrigeration Controls Ice Cream Quality"; Sollman, Everette I., page 188, "Refrigeration Vital in the Margarine Industry"; Vollertsen, J. J., page 189, "Refrigeration in Lard Manufacture"; and Leavitt, G. E., Jr., page 190, "Vegetable-Oil Shortening Has Rigid Refrigeration Needs"). The first describes, among other things, the batch freezer. The second shows a flow chart of margarine involving the churning and "wet" emulsifying system. The third and fourth articles, referring respectively to lard manufacture and to vegetable-oil shortening, deal with the roll type of chilling in common use for the production of lard and lard substitutes.

Probably the batch ice-cream freezer has not been used in the production of margarine, lard, or lard compound because sufficiently rapid and satisfactory crystallization of lard substitutes and margarine cannot be obtained with the relatively thick layer or mass of material present in the batch freezer, as compared to the thin layer, and therefore more rapid crystallization is obtainable with the roll. Also the roll permits continuity of operation and flow of the product through the crystallizing and whipping steps, which, of course, is not possible with the batch freezer. Further, only a small percentage of air (4 to 10 per cent) need be incorporated in lard to obtain the necessary whiteness, whereas in ice cream, containing 100 per cent "overrun," approximately 50 per cent of the final ingredients by volume is air or other gas, and the remaining 50 per cent represents the original ingredients of the ice cream mix.

Quite possibly this difference in air or gaseous content accounts for the general adoption about twenty-five years ago of the batch freezer, as it was about that time that the pioneers in the ice-cream industry realized that ice cream, to be palatable, must contain a fairly large percentage of "overrun."

It has long been known that a thin film of material can be cooled or heated more rapidly than a thick film of the same material where other conditions are identical; also there is first-hand evidence that previous attempts have been made to confine a material to a thin layer while its state was being changed. Without exception, these previous schemes and plans failed to accomplish the anticipated results.

Now that means and methods of successfully carrying out the rapid treatment in a thin confined space have been discovered, the reasons for previous failure

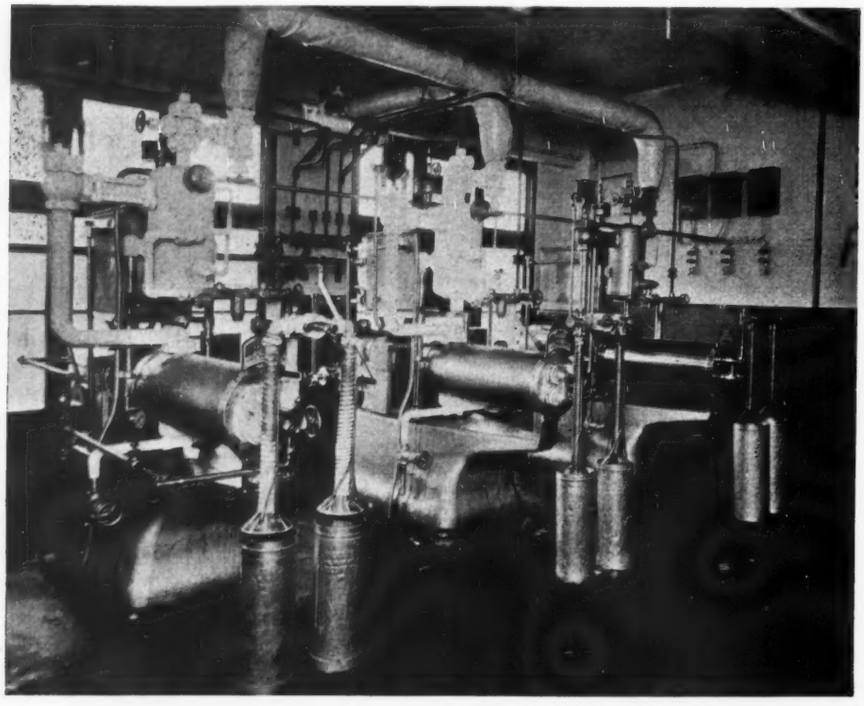


Fig. 1 — A battery of three quick-freezing units installed in a large Australian ice cream plant

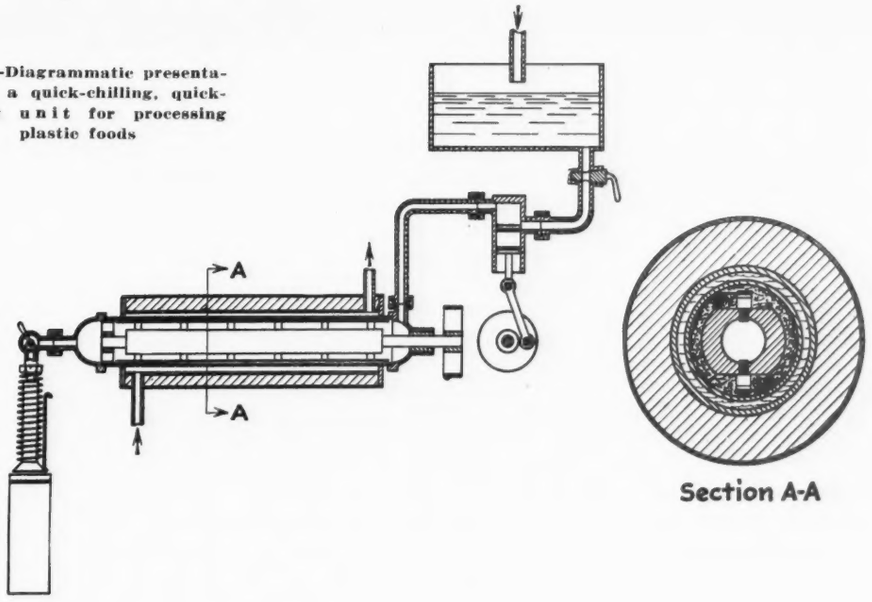


Fig. 2—Diagrammatic presentation of a quick-chilling, quick-freezing unit for processing plastic foods

become understandable. Former available types of controls, while adequate for relatively slow processing or processing on exposed surfaces, are inadequate when applied to confined surfaces, applied in a small percentage of the time formerly required, and carried to degrees beyond what had been possible previously. One of the inherent weaknesses of the earlier apparatus was the attempt to utilize the single-screw principle as the advancing as well as the agitating means. The discovery of methods and means for accomplishing this processing in a thin layer has resulted in the recent introduction of the apparatus shown diagrammatically in Fig. 2 and in the accompanying photographs.

This apparatus consists essentially of one or more process tubes the outside of which are subjected to a cooling medium and in which are mounted revolvable propelling and/or whipping shafts, together with the necessary features of rapid, accurate, and readily adjustable control. These control factors play an important part in rendering the mechanism substantially "foolproof." The material to be treated is forced through the confined space under pressure, in such a way that it is whipped, chilled, and frozen in a continuous manner. In this new type apparatus the desirable feature of the thin layer of the roll type apparatus and the effective whipping and film removal features of the batch freezer are both present and at the same time it is not subject to inherent limitations of these previous types.

The principles of effective agitation of the material while being forced through a thin confined space have been found to have a very definite use in the heat-treating of many bulk materials such as cream, milk, vegetable oils, and the like. When applied to the primary freezing of ice cream, these principles make possible more complete processing in only 2 per cent of the time required by the most efficient commercial equipment using the older principle. Furthermore, these results are obtained without resorting to refrigerant temperatures lower than those already prevalent in the industries involved. Equipment embodying these principles has been made available to these industries, first as a primary ice cream freezer and subsequently for the chilling or crystallizing of other products, including lard, lard substitutes, and margarine, as well as the rapid heating, chilling, or freezing of many other materials. During the past twelve months well over 100,000,000 lb. of food products has been produced by equipment involving these principles.

The units shown in Fig. 1 have a combined capacity of more than 1,500 gal. of ice cream an hour. This capacity is based on refrigerant temperature higher than —25 deg. F., and the capacities of the units become proportionately higher with refrigerating media having the extremely low temperature advocated by some of the proponents of quick freezing. Each unit has only 10 sq.ft. of effective refrigerating surface.

Freezers of the batch type, using the same temperature refrigerant and producing ice cream of the equivalent "overrun," require approximately four times this amount of surface and a material displacement more than fifty times as great. Even then the ice cream would not be processed to the degree of stiffness that is obtained by the continuous, thin-layer pressure type, freezing unit.

In crystallizing lard and lard compound, these new type units prevent the entrainment of moisture and also prevent the oxidation of the oils or fats by contact or exposure with air. Obviously this is practically impossible with the roll type of equipment. While the same high and uniform quality product is not obtainable by the roll type of chilling apparatus, the latter, with only the same approximate capacity, has more than 100 sq.ft. of effective refrigerating surface, whereas the unit shown in Fig. 3 has a capacity of 7,000 lb. of lard and lard compound an hour and has an effective refrigerating surface also of only 10 sq.ft.

One of the phenomena observed while experimentally processing lard and lard compound with equipment embodying the new principles was the fact that the material passing through the first or crystallizing unit was "super-cooled" 10 to 20 deg. F. and that some additional time was needed to permit sufficient crystallization of the super-cooled mass. This is now taken care of in the secondary chamber substantially free from any intensive refrigerating effect during the crystallizing or setting period.

Full advantage of the principle that the degree of solubility of gases in liquids bears direct pressure relationships may be utilized in this type of apparatus in which the gas (preferably inert, such as helium or nitrogen) is mixed in the desired proportion with the remaining ingredients and the mixture passed through the crystallizing unit under pressure and maintained under pressure during the crystallizing stage. It has been found that upon release of this pressure, some of the dissolved gases are released from solution with the material in the form of very minute globules which, due to their minuteness, are thereupon retained in the then

"set" mass, thus giving a uniformity of opacity not otherwise obtainable.

With its 10 sq.ft. of effective refrigerating surface the new equipment has an hourly capacity of 5,000 to 6,000 lb. when applied to margarine. By virtue of processing the emulsion in the first and secondary units under pressure, much of the equipment, such as churning, working, "standardizing," and salting equipment, needed in the roll and "wet" type systems has been eliminated. The ingredients are correctly proportioned, emulsified, and churned prior to and during their passage through the chilling and crystallizing units. Inasmuch as the entire processing is carried out in these units in a completely closed system, there is no opportunity for loss of any salt or moisture originally contained. The salt can be added with the original ingredients instead of later, as is now the case, with the open type apparatus either of the "wet" or the roll system. Furthermore, the new, closed system type of processing is carried out from the mixing of the milk and oil ingredients through to the cutting, wrapping, and packaging with a reduction of more than 95 per cent in floor space and more than 95 per cent in labor as compared to the "wet" system; 75 per cent as compared to the roll.

A noticeable improvement in product quality is explained by the fact that each particle in the material received uniform treatment. As a consequence of the more complete "chaining" of the fat globules, the finished product has no tendency to become brittle or flake upon cutting, and has the desirable quality of spreading in true butter fashion.

Air, which has the effect of whitening the product, is of course excluded, an accomplishment which is not possible with the open roll. The "wet" system, while requiring more space and labor, is still in use in some plants, probably because there is less whitening of the product by this system than with the open roll system. This whitening of the product in this country is undesirable on account of presumed buyer prejudice. Such prejudice does not exist to the same degree in European countries, where margarine is sold even in greater proportions than in the United States. It may be noted that with neither the "wet" system nor the roll system is oxidation or the entrainment of atmospheric moisture completely or even substantially prevented.

Application of the quick-chilling and quick-freezing principles indicated the need for better auxiliary equipment, such as more sensitive, effective, and practical controls, both for the refrigerating medium and for the pumping apparatus. Such equipment has been developed and is now available. The ability to produce products and to process commodities to the degree where their fluid characteristics have been more completely removed makes unnecessary the heavy liquid-tight containers which have been needed until now to permit the proper forming and packaging of such commodities.

The process of quick-chilling and quick-freezing food products has, in the main, involved forcing or stretching the available equipment to greater extremes; the major changes involved lower and, obviously, more costly temperatures. In the accomplishments herein outlined it will be noted that the changes in the processing principles have been effected without resorting to these lower temperatures and the improvement in quality and uniformity of the product has been obtained with a concurrent measurable and appreciable saving in refrigeration costs as well as all other elements entering into the cost of manufacture.

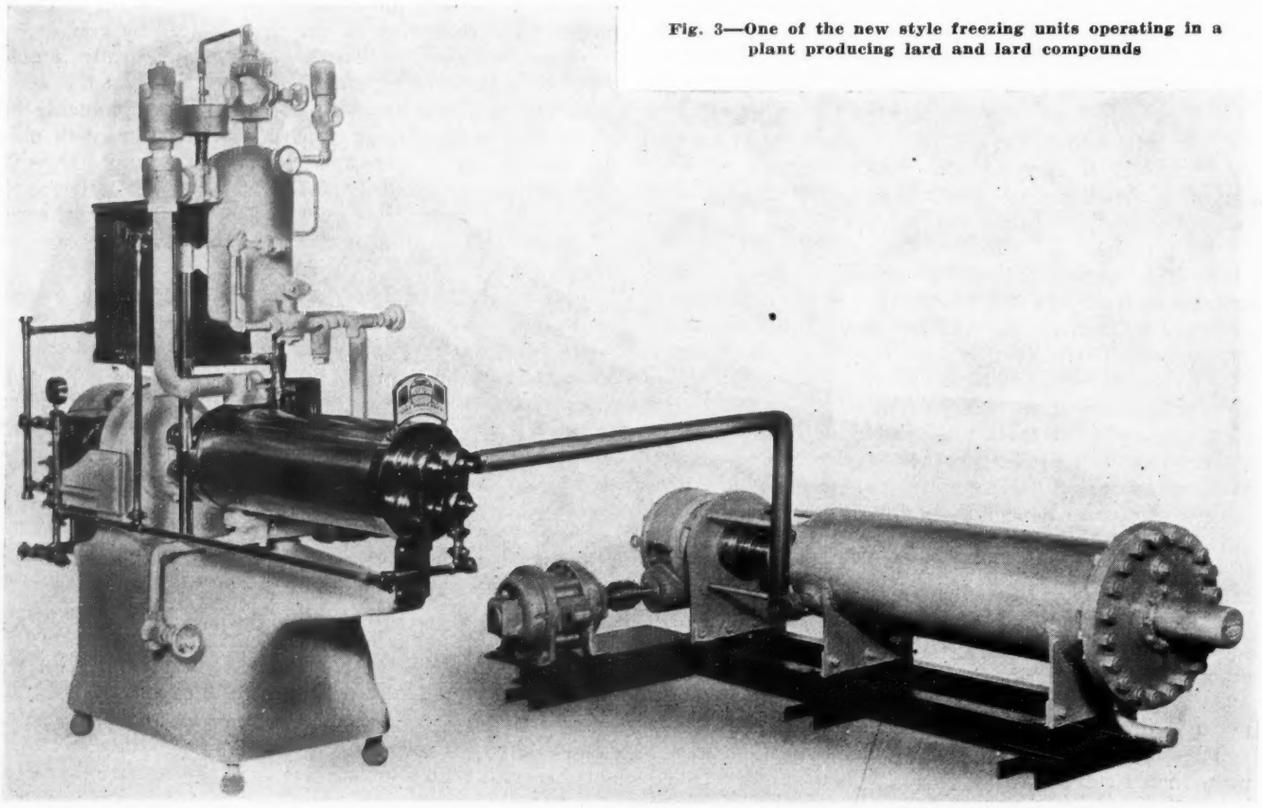


Fig. 3—One of the new style freezing units operating in a plant producing lard and lard compounds

Know Your Wrappings

By HAROLD A. LEVY

Manager, American Products Manufacturing Co.
New Orleans, La.

WITH a market trend toward the individual packaging of all types of merchandise, wrapping materials assume increasing importance. The fact is commonly recognized that commodities wrapped in single units reach the consumer in a more acceptable form than those marketed in bulk. Many articles are sold today because of their packaged-form appeal. The factory-wrapped commodity offers a safe means by which the manufacturer can identify his product and, at the same time, assures the consumer of uniformity, accuracy of measure, and the receipt of the product in approximately the same condition as the manufacturer packaged it.

Wrappings consist of materials formed into thin sheets. The purpose of wrapping is too obvious to be dilated upon. However, the requirements of wrapping materials are not quite so well known. Probably the most important requirements of a finished wrapper are:

It must make a self-sustaining package.

It must give protection against injury and prevent physical or chemical changes in the condition of the product.

It must be attractive and have sales acceptance.

There are, of course, many specific requirements of wrapping material such as its strength in tension and in flexure; its degree of porosity; its waterproof, oil-, and greaseproof qualities; its freedom from taste and odor; its permanence of values possessed at the time of its initial use; its transparency; its workability.

During the past decade a new type of wrapper has been brought into extensive use. It is the completely transparent sheeting which is seen on so many forms of packaged material today. Probably the most striking contribution offered by this new type of wrapping is that it embodies, in a single material, almost everything that could be desired of a wrapping.

To the trades the term wrapping material seems to be almost synonymous with the term "paper." This likeness, however, while it might apply generally, probably stretches the term "wrapping material" to include materials which cannot consistently come under this heading. Under the caption of papers we can include nearly all forms of wrappings. In this discussion we are more interested in the particular form of papers which come into close proximity with the articles wrapped than the outside or heavy wrapping papers which are used to cover and protect a large number of unit packages. Consequently, we are not concerned at this time with such general paper materials as the various forms of kraft, manila, and other heavy wrapping papers. We are more concerned with the special or modified forms of the papers used for the inner wrappings which remain in close proximity to the wrapped object for a longer period of time than the shipping wrappings, and until the object is used or consumed. These forms of papers include such classes as the tissues, glassines, vegetable parchments, waxed papers, and resin-treated papers.

In addition, there are other forms, which cannot be classified as papers, but are used as such. These include such materials as the completely transparent forms of sheeting referred to above, and appear in the following forms:

Gelatine sheeting (Marsene[1] and the like).

Viscose sheeting ("Cellophane,"[2] "Fenestra," "Sylphrap,"[3] etc.)

Viscose sheeting, nitrocellulose coated (moistureproof Cellophane[4]).

Gelatine sheeting, nitrocellulose coated.[5]

Cellulose acetate sheeting (Inceloid[6]).

The above materials, while not paper, have the chemical constituent—cellulose—in common with paper (except the gelatines). The following materials, on the other hand, are brought into the discussion only because of the fact that they are in sheet form, and are used for wrappings. They are the metallic foils made from such metals as tin, lead, terne (lead-tin alloy), and aluminum. In addition, we have the combination of paper and metal foil in such forms as foils cemented to paper stock, also metallic-coated paper which is composed of paper stock with the pigments either printed on or bonded to it by a suitable coating solution. There also is a product consisting of paper which has the metallic coating applied by means of a spray.

A property of wrapping material which has been given more serious consideration of late—probably more than any other—is the condition maintenance value. As this phase implies, the purpose of the wrapping is to maintain the wrapped object in the same condition as when it was originally wrapped by the manufacturer. This property is summed up in the term which we call "freshness," which includes such values as the initial moisture content, flavor, and odor. In order to maintain the permanency of these values the wrapping material must have as low a degree of porosity as possible. Pores of microscopic size and inconceivably small passageways in dialyzable membranes transmit, in a relatively short period of time, substantial quantities of moisture or water vapor, as well as the flavor and odor possessed by the wrapped product.

Empirical methods of determining the relative transmission values of various types of wrappings have been used for many years. These, of course, give no absolute values and throw but little light on the exact nature or suitability of a given material for a particular purpose, as has been pointed out in an article by Allen Abrams and W. A. Chilson on "Vapor Transmission Through Papers," *Paper Trade Journal*, Oct. 30, 1930. The many factors controlling the exact amount of moisture transmission through various forms of sheeting has been presented in detail in this article. Moisture-proofness or resistance to the action of moisture has heretofore been confused with waterproofness. It is now incorrectly used to convey the idea of resistance to the transmission of water vapor through a given material. A material may readily be waterproof and moisture-proof and at the

1. Marsene Transparent Paper Co., Gary, Ind.
2. DuPont Cellophane Co., Buffalo, N. Y.
3. Sylvania Industrial Corp., Fredricksburg, Va.
4. DuPont Cellophane Co., Buffalo, N. Y.
5. S. W. Weis, Straus Bldg., Chicago, Ill.
6. American Products Mfg. Co., New Orleans, La.

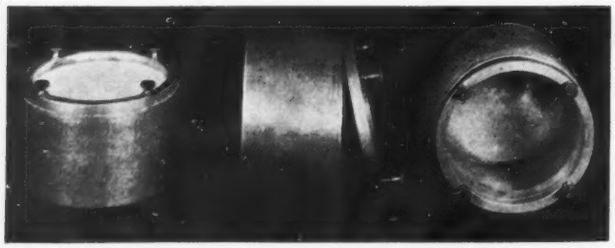


Fig. 1—Apparatus used for testing moisture transmitting qualities of wrappings

same time not necessarily be proof against the transmission of water vapor through its mass. A metallic screen or a rubber sponge, for example, is completely waterproof and moisture-proof but offers little resistance to the passage of water vapor.

Many means have been proposed to determine the rate at which a given quantity of water vapor will pass through a certain medium. A simple experiment, giving a vague idea of this property, consists in affecting a small amount of an organic dyestuff with the moisture which passes through the sheeting to be tested. This sheeting is placed over a mixture of dyestuff and powder, and in close contact with it. A drop or two of water is then placed on the top surface of the sheeting. The time required for the water to pass through the sheet is shown by a coloring which appears immediately after the water has come in contact with the dye, which colors the material mixed with it. This method has only a single merit: that of easy performance.

Methods have been worked out to give exact values under definite control conditions which can readily be duplicated by an operator maintaining these exact conditions. One method consists in establishing a definite and constant humidity head or humidity difference on each side of the sheeting, and a constant temperature. A definite rate of movement of air is established and maintained constant. The rate of water-vapor transmission through the sheeting would then be expressed in such quantities as the weight of water transmitted through a unit area in a given time. This has been expressed in grams per 100 sq.in. per 24 hr. at a temperature of 70 deg., and a humidity head difference of 50 per cent.

This was accomplished by the use of a metal vessel, as illustrated in Fig. 1, designed by Allen Abrams and made by Thwing Instrument Co. It consists of a metal container with a removable rim, which clamps the sheeting on as a cover, exposing exactly 100 sq.in. of area to the transmission of water vapor. The vessel contains more than an ample quantity of water to cover the bottom of the vessel for the period of the test. Obviously, the air space between the surface of the water and the underside of the sheeting, after a small time interval, reaches 100 per cent relative humidity at the existing temperature. This vessel, or as many as may be desired to be used at one time, is placed in a constant temperature-humidity compartment, as shown in detail in Fig. 2, for a definite period of time. The quantity of water vapor transmitted through the sheeting is measured by means of the loss in weight due to the evaporation of water within the vessel during the time interval in which it is subjected to the test conditions.

The conditions adopted as standard are 70 deg. F.; 50 per cent relative humidity; air movement, 450 ft. per min.; time interval of 24 hours, and daily measurements for a period of a week. As most of the sheeting available varies in thickness between 0.001 and 0.002 in., the results will be fairly comparable. All the other conditions are known and are maintained constant. The water-vapor transmission values are then expressed in grams per 100 sq.in. per 24 hr. at 70 deg. F. and 50 per cent relative humidity. The transmission values of various materials are indicated in the table, from data furnished by Allen Abrams.

From these data it is noted that many of these wrappings are quite porous, the most resistant of them being wet waxed paper, among the paper materials, while nitrocellulose-coated viscose sheeting is the most moisture-penetration-resistant of all the materials tested. Theoretically, metal foil should be completely moisture-penetration-resistant. However, small cracks develop from bending, while pervious openings develop in the rolling process. These conditions probably account for the small passage of moisture indicated. Tests with gases, other than water vapor, indicate that the general behavior is very similar. However, from the test, we are prompted to believe that there is a retention of odor and flavor by the wrapped objects when such impervious sheeting is used.

Water Vapor Transmission Values of Various Materials

	Grams per 24 Hours
Open cup	150
Silk handkerchief	76
Tissue paper (0.0007 in. thick)	63
Viscose sheeting (0.0009 in. thick)	60
Cellulose acetate sheeting (0.0009 in. thick)	40
Glassine (0.0014 in. thick)	30
Vegetable parchment (0.0017 in. thick)	25
Dry waxed paper (0.0016 in. thick)	10
Wet waxed paper (0.0018 in. thick)	2
Gelatine sheeting (0.0011 in. thick)	56
Gelatine sheeting (nitrocellulose coated) (0.0013 in. thick)	13
Viscose sheeting (nitrocellulose coated) (0.0011 in. thick)	0.4
Metal foil (aluminum, 0.007 in. thick)	0.7
Resin treated paper (0.0009 in. thick)	2.3
Rubber sheeting (0.006 in. thick)	0.6
Metal coated paper (0.0028 in. thick)	0.5

A peculiar phenomenon observed in connection with these tests is the moisture condensation which occurs on the under surface of the sheeting used as the cover or membrane of the test container. With sheeting of a relatively high degree of porosity or moisture transmission value (in excess of 10 grams per 24 hr.), there is practically no moisture condensation on the under side. On the other hand, if the transmission resistance is less than 5 grams of water per 24 hr., there is a very appreciable moisture condensation on the under side. It is also noted that in such types of sheeting there appears to be a lack of wetting of the surface exposed to the higher humidity. This condition is vividly brought out by the fact that a given form of sheeting may be treated on one of its surfaces with waxlike substances and then tested for its moisture transmission value. It will be observed that the moisture transmitted from the treated side to the untreated side will be substantially less than for the opposite direction. These findings lead one to believe that the "wettability" of the surface of such sheeting is the most important factor in determining the moisture transmission value.

While the table indicates several forms of sheeting which have moisture transmission values of the less than 1 gram, the public decidedly favors the transparent sheetings. Such products have a tremendous advantage over all other forms of wrappings. In addition to being available with nitrocellulose coating, thus conferring a low moisture transmission value, they possess 100 per cent, or complete, transparency. This means that the transparency is equivalent to glass, water, or the like, as distinguished from the semi-transparency or translucency of waxed or oiled papers and the glassines. This completely transparent sheeting not only makes the

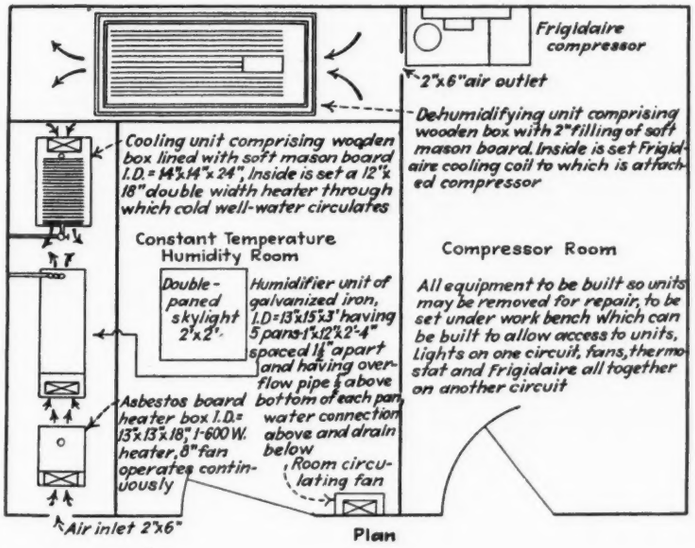
wrapped merchandise fully visible but at the same time is itself invisible except for the brilliant sheen of its surface. This last property is possessed by no other forms of wrapping, except gelatine, viscose, and cellulose acetate sheeting. Although metal foil and metal-coated paper possess a high resistance to moisture transmission the opacity of these wrappings has been a very substantial handicap to their extensive use. In addition, transparent wrappings can now be purchased at a cost per 1,000 packages in some cases considerably lower than that of metal foil.

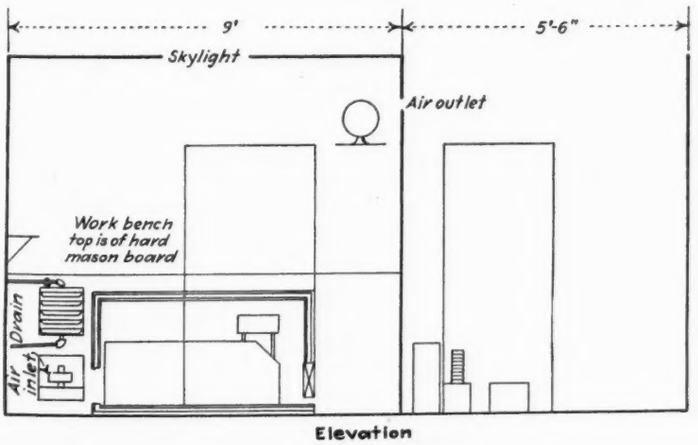
The transparent type of sheeting has met with such a warm reception by the buying public, due to the great amount of publicity given to it by its largest vendor, that the American buyer now associates the quality object with one inclosed in a transparent wrapper.

The bonding of this type of sheeting formerly offered problems which have since been solved by the development of satisfactory adhesives. However, the important function of these adhesives is merely to hold the wrapping closed, rather than to make a hermetic or gastight joint. Strange as it may seem, moisture transmission through various types of sheeting, even the more resistant forms, is greater than that which takes place through a loosely wrapped and leaking package. Oft-repeated tests by many different workers have confirmed this fact, but a trial by the reader probably will be necessary to convince him of this phenomenon. A freshly prepared piece of cake may be wrapped in some form of moisture-transmission-resistant sheeting whose transmission value approximates one gram of water per 100 sq.in. per 24 hr. Then one end of this wrapping may be carefully opened or trimmed away with a knife and the cake allowed to stand for several days at a relative humidity of about 75 per cent. If this package is carefully unwrapped the observer will note that while the exposed end has become dry and stale, the end which remained wrapped will have retained a substantial amount of its moisture content and at the same time be relatively quite fresh, even though there was substantial leakage at the joints.

From these findings it is obvious that the empirical methods of testing shed only a vague amount of light upon the relative values of various wrappings, even those that may have been tested simultaneously. They gave no absolute values that would be used to determine in advance what the condition of a product would be after a given period of time when subjected to certain temperature and humidity conditions. However, these values can be predetermined with a reasonable degree of accuracy with the apparatus described.

A prospective user can readily anticipate what degree of moisture transmission he may expect from a given type of sheeting whose values have been determined in a quantitative manner with this apparatus. This property of resistance to moisture transmission is of primary importance to most forms of food products. While the desideratum in products such as bread, cake, etc., is to retain their moisture content without appreciable loss, there are other forms, such as crackers and the like, where it is necessary to prohibit any gain in moisture. In addition, there are products, such as coffee and tobacco, which must be inclosed in a form of wrapping that will retain the original odor and flavor.


Frigidaire compressor
2"x6" air outlet
Dehumidifying unit comprising wooden box with 2" filling of soft mason board. Inside is set Frigidaire cooling coil to which is attached compressor
Cooling unit comprising wooden box lined with soft mason board I.D. = 14"x14"x24", Inside is set a 12"x18" double width heater through which cold well-water circulates
Constant Temperature Humidity Room
Compressor Room
Double-paned skylight 2'x2'
Humidifier unit of galvanized iron, I.D.=13"x15"x3" having 5 pans 1"x12"x2'-4" spaced 1½" apart and having overflow pipe ½" above bottom of each pan, water connection above and drain below
All equipment to be built so units may be removed for repair, to be set under work bench which can be built to allow access to units. Lights on one circuit, fans, thermostat and Frigidaire all together on another circuit
Asbestos board heater box I.D.= 13"x13"x18", 1-600 W. heater, 8" fan operates continuously
Room circulating fan
Air inlet 2"x6"
Plan



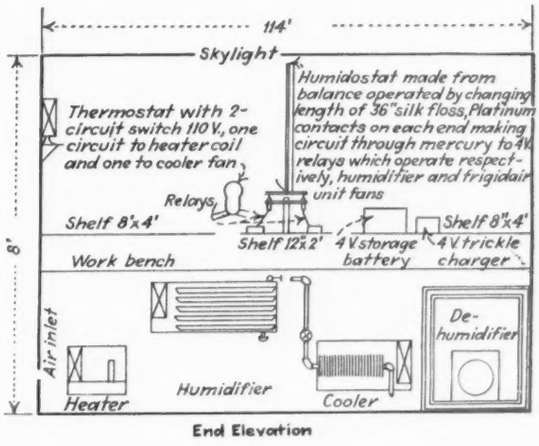

11'-4'
Skylight
Humidostat made from balance operated by changing length of 36" silk floss. Platinum contacts on each end making circuit through mercury to 4V relays which operate respectively, humidifier and frigidaire unit fans
Thermostat with 2-circuit switch 110 V., one circuit to heater coil and one to cooler fan
Relays
Shelf 8"x4'
Shelf 12"x2'
4 V storage battery
4 V trickle charger
Shelf 8"x4'
Work bench
8'
Air inlet
Heater
Humidifier
Cooler
De-humidifier
End Elevation

Fig. 2 — Layout of constant temperature, humidity room, lined inside and outside with soft Mason board. Inside also covered with hard Mason board, enameled white. Lighted through a double skylight from light units set outside room. Ventilation supplied by taking air in at one corner and discharging at another. Humidity controlled by length of a silk floss thread, any change operating a Frigidaire dehumidifier and fan in water humidifier. Temperature is regulated by a Mercoid thermostat which operates an electric circuit to heat, turning on a resistance heater (fan going constantly); to cool, it turns on fan through the Trane unit in which cold water is circulated

Vitamins—A New Industry*

By C. N. FREY
Director Fleischmann Laboratories
New York City

THE development of the science of nutrition began with the 18th century. The experiments of Mayow, Boyle, Priestly, and Black laid the foundation for the work of Lavoisier, Laplace, DePretz, and Dulong. Lavoisier is often called the creator of organic chemistry, but it would be better to state that he was the creator of the atmosphere in which organic chemistry developed. Justus von Liebig inherited the ideas of the French school, and upon this foundation the chemistry of nutrition developed.

It is perhaps not so well known that some of the earliest work on the physiology of digestion was performed on the frontiers of the United States about 100 years ago. Dr. Beaumont was able to observe the contents of the stomach and he noted the conditions under which digestion takes place. He studied the stomach when various kinds of food were given the patient. Beaumont also wrote on foods. He believed that there is a single "aliment" present in all foods.

The work of Lavoisier was concerned chiefly with the nature of animal heat, but it was not until the time of Rubner that the law of conservation of energy could safely be applied to nutrition. It is only a brief time since the work of Rubner appeared, and yet astonishing progress in the field of nutrition has taken place.

Previous to 1910 the chemist was chiefly concerned with the protein, carbohydrates, and fats of the ration and their proportions in the diet, to a lesser extent with the mineral matter. It was found that the average man would require about 3,000 calories per day. The mineral elements listed as necessary for nutrition usually were given as follows: phosphorus, calcium, iron, sulphur, sodium, potassium, iodine, chlorine, and magnesium. The virtues of copper were unknown.

About the year 1910 a new point of view was becoming evident. The work of Eijkman, 1897; Hopkins, 1906-12; Babcock, Osborn, and Mendel, 1913; McCollum, 1914; Funk, 1910; and others was gradually changing our point of view in regard to the problems of nutrition. In 1913-14 the work of Osborn and Mendel and McCollum appeared, showing that in addition to the substances previously known to be necessary for nutrition, two unknown factors, later known as vitamins A and B, were required to produce normal growth and reproduction. The work on vitamins progressed very rapidly. This new conception concerning the nature of foods has changed ideas on nutrition greatly. At the present time scientists have accepted six vitamins: the A vitamin, or anti-xerophthalmic; the B vitamin, or anti-neuritic; the C vitamin, or anti-scorbutic; the D vitamin, or anti-rachitic; the E vitamin, or reproductive vitamin; the G vitamin, or anti-pellagra.

The discovery of vitamin D and the effects of ultra-violet rays in the activation of foods and in the prevention and treatment of rickets are three of the outstanding achievements in the field of nutrition. In 1922 McCollum and coworkers presented conclusive evidence that there is in cod liver oil and butter fat a substance distinct from vitamin A which causes the deposition of calcium in the bones. It has been known for many years that cod liver oil is effective in the control of rickets. Nearly 300 years ago (1597-1667), Glisson described infantile rickets, and since that time it has been definitely recognized by the medical profession. Schabad, in 1910, in connection with a study of fats in relation to rickets, showed that cod liver oil possessed peculiar properties in relation to the utilization of calcium and phosphorus.

Huldschinsky, in 1919, reported that ultra-violet rays exerted a curative action on rachitic children. Light waves longer than 3130 Angstrom units have very little therapeutic action in the prevention of rickets. Hess, in 1921, reported that at least 60 per cent of the children in New York were rachitic. Colored children suffered more severely than white. Steenbock and Hess, in 1924, working independently discovered that foods, particularly those containing lipoids, could be made anti-rachitic by treatment with ultra violet light.

In 1926, Windaus and Hess reported that if cholesterol is excessively purified or treated with mild oxidizing agents, it can no longer be activated. The mother substances of vitamin D must, therefore, exist in cholesterol as an impurity. They suggested that ergosterol may be the pro-vitamin, inasmuch as it cannot be separated readily from cholesterol. They also indicated that ergosterol presented an absorption band in the ultra violet corresponding to that observed with active cholesterol. Further experimental work showed that ergosterol is the active substance.

It is remarkable that about two years after the discovery of ergosterol and four years after the discovery that foods could be activated by irradiation with ultra violet, a well-established demand for irradiated ergosterol had been developed. It was found that yeast would be the most economical source for this material.

A tremendous amount of experimental work was necessary before irradiated ergosterol could be placed on the market. When it is recalled that all these studies were undertaken and carried out during a period of three or four years, and that frequently biological tests requiring ten to twelve months for their completion were conducted, it is readily seen that the progress made in this field is really one of the most remarkable accomplishments of biological science. If some means of testing vitamin D other than biological were known, the progress of vitamin research would be enormously increased.

The question now arises, how can this scientific work, touched upon so briefly, be developed into an industry? We have such industries as the cod liver oil industry, which sells its products chiefly for their vitamin content. A great deal of yeast is sold purely for its vitamin B, G, and D content. Oranges, tomatoes, spinach, and wheat germ are largely consumed for their vitamin content. A large bread company in 1922 manufactured a bread containing vitamins in quantities sufficient to make bread a medium for normal growth and reproduction. Margarine may have vitamin D incorporated. There are thus many avenues for the distribution of vitamins, and a large variety of products may serve as carriers of vitamins.

We have come to the point where we must determine the trend of these developments. This is especially true in respect to the distribution of vitamin D. It has been found that goats, and possibly cows, can be irradiated and the milk increased in vitamin D. Cows may be fed activated yeast or irradiated ergosterol, as shown by Steenbock, Krauss and Hess, and a satisfactory anti-rachitic milk can be produced. The milk may be adjusted by adding a small quantity of irradiated ergosterol. Recently a manufacturer of bread has decided to add ergosterol to the fat in the bread. Irradiated yeast is offered as a source of vitamin D. The use of activated dried yeast is a satisfactory means of curing rickets, and Hess has used fresh and dried yeast in his experimental work on children. Cod liver oil or fish oils can be fortified with vitamin D, and, of course, Viosterol (irradiated ergosterol), distributed by the pharmaceutical houses, offers a very satisfactory method of controlling rickets. In addition, irradiated breakfast foods have been placed on the market and, recently, ultra-violet lamps have been used in many homes and the subject directly irradiated. Possibly after a period of four or five years we shall find the best means of distributing vitamins and satisfactory conditions for control of potency and the regulation of distribution. We shall undoubtedly bioassay all food products sold chiefly for their vitamin content.

The great advances which science will make in the next 50 years undoubtedly will influence the food industry and place it in an entirely different position. We shall undoubtedly not hold the ideas of Beaumont that all food is a simple aliment, and many of the theories held at present will fall by the wayside. We probably shall have purified hormones, crystalline vitamins, and more refined foods. Our diets will be better balanced in respect to the ingredients necessary for good nutrition.

*Abstract of paper given at Purdue University Chapter of Sigma Xi, May, 1931.

Patents on Vitamin Production By Ultra-Violet Light*

By E. S. STATELER
Assistant Editor
Food Industries

THE patent covering irradiation by ultra-violet light that has attracted the greatest public interest is that entitled "Anti-rachitic Product and Process" granted to Harry Steenbock, Madison, Wis., by the British Government (No. 236,197) on June 30, 1924; by the U. S. Government (No. 1,680,818) on Aug. 14, 1928, and by the Canadian Government (No. 291,138) on July 9, 1929.

This patent provides for imparting anti-rachitic properties to dietary organic substances such as carbohydrate foods, fats, oils, protein foods, or composite foods. Proposal is made that these foods be subjected to the ultra-violet rays produced by a quartz mercury vapor lamp for a period sufficient to effect anti-rachitic activation, but so limited as to avoid subsequent deterioration of the anti-rachitic substances or of the palatability of the foods so treated. Specific application of this process designates treatment of: (1) oils and fats containing unsaponifiable lipoids; (2) liquid glycerides naturally deficient in anti-rachitic properties; (3) olive oil, and (4) food substances naturally deficient in anti-rachitic substances.

Although the applications for patent grants were filed 38 months apart, on the same date, Aug. 14, 1928, patent rights (No. 1,681,120) were granted August J. Pacini, Chicago, Ill., for the production of anti-rachitic substances and their products. This grant merely provided for the preparation of materials containing growth-producing substances in such a manner that at least some of these growth-producing substances would be replaced by anti-rachitic products. The method of treatment of growth-producing substances is to be irradiation with rays of light having a wave length greater than about 3022 Angström units.

This grant to Pacini was amplified by another one (No. 1,762,105) dated June 3, 1930, in which his application of ultra-violet radiation treatments includes wave lengths beginning at about 4000 Angström units and extending throughout the near, middle, and far zones of spectrum rays, including those of the so-called "border-line" rays where X-rays and ultra-violet rays become inseparable, which is to say that all rays having wave lengths from 4,000 to 500 Angström units (0.4 to 0.05 micron) are included.

Further definition was given to Pacini's claims by the patent (No. 1,771,343) granted July 22, 1930, in which he provides for the formation of vitamin D from sterol-containing substances by radiation with wave lengths not shorter than 3022 Angström units (0.3022 micron) by making use of such catalyzing agents as chlorine, bromine, iron salts, uranium salts, titanium salts, ozone, certain unnamed organic dyestuffs, and other unnamed substances.

Although four of the five claims of this patent grant involve the use of a photo-catalyst, the fifth claim provides for preparing sterols so that they become anti-rachitic through treatment with rays longer than about 3022 Angström units (0.3022 micron). In text of the patent, specific dissertations are given concerning the treatment of growth-producing substances with radiations of light having wave lengths beginning at 3022 and extending to 2000 Angström units, from which all shorter wave lengths have been filtered out by ordinary glass; with radiations of light from a Cooper-Hewitt work lamp operating on 110-volt direct current for a period of two hours; with radiations of light from a quartz mercury vapor lamp passed through an ordinary window glass to the material treated; with infrared radiations longer than 9000 Angström units, not glass filtered, for a long exposure period; with radiations of heat having wave lengths of 3300 Angström units (shorter wave lengths being filtered out); with radiations of the same intensity having wave lengths that lie in the region greater than 12000 Angström units; with radiations of monochromatic light in the region absorbed by the material; with radiations from sunlight for long period of time; with radiations of cathode rays of ordinary Lenard or X-ray tubes and with radiations from radio-active substances such as thorium, radium, and uranium for the production of anti-rachitic substances. Specific reference is made to extracts of growing organisms such as certain fungi and bacteria, sarcomatous tissue, and ergot of rye; to ergosterol, ordinary cholesterol; corn, linseed, peanut, and other seed oils; to cereal products, including rolled oats, cornflakes, bran flakes, and correlated goods; to cocoa butter, alone or in chocolate and similar products; and to such amino-acid substances as tyrosine.

Prior to the last two patents granted Pacini, on June 3 and July 22, 1930, Jacques W. D. Chesney, Chicago, Ill., on March 5, 1929, was granted patent (No. 1,704,173) in which he proposes a method of utilizing the ultra-violet rays of the sun for the production of vitamin D in substances susceptible to such activation. Chesney proposes separation of the solar ultra-violet rays having wave lengths within the range of substantially 2900 to 3700 Angström units and intensification by passing them through lenses for concentration upon the material to be treated.

Subsequent to the other patents mentioned and also prior to the last two patents granted Pacini, Joseph Perino, Stettin, Germany, was granted United States patent No. 1,754,434 on April 15, 1930, in which he described a process of manufacturing a food product by exposing vegetable, alimentary material containing soluble phosphates to ultra-violet rays and heating to a temperature not exceeding 60 deg. C. in an atmosphere of reduced pressure and low in oxygen content—more specifically in an atmosphere of CO_2.

On July 10, 1928, approximately one month before Steenbock was granted his patent, George Sperti and coworkers at the University of Cincinnati, Ohio, were issued patent No. 1,676,579, covering the sterilization and activation of food by selective irradiation by ultra-violet light. Although issued before the Steenbock patent, application for this grant was not filed until approximately two and one-half years after Steenbock had filed his claims.

In this patent Sperti, et al. state that their work showed bacteria to be killed by light rays with wave lengths beginning at approximately 2750 Angström units; that enzymes were rendered inactive by light rays having wave lengths of 2420 Angström units and shorter; that radiations of wave lengths greater than 2750 Angström units did not kill bacteria; that by utilizing light rays with wave lengths greater than 2400 and not greater than 2750 Angström units the bacteria were killed without inactivating the enzymes and that a filter screen filled with a 5 per cent solution of lead acetate in pure water gave the desired effect.

They also set forth that bacteria in a substance containing a diastatic enzyme were killed without affecting the enzymes; that enzymes were prevented from converting sugars into alcohols during fermentation by gas-producing bacteria; that protozoa were destroyed in solutions without changing the desirable materials in the solution; and that a suspension of yeast in a thin film can be subjected to the filtered light from the quartz lamp for a prolonged period of treatment without deleterious effect or by repeated instead of prolonged exposures.

Becoming more specific, they formulated the procedure for activating portions of substances without activating undesirable portions by determining the critical action for each substance. In treating cod liver oil to activate the vitamin D, a specific and critical band of light radiations would give the desired result without danger of inactivating the vitamin because of overexposure. Claim was made that it will be possible for the investigator to use the various filters now available or made by himself in determining what will be the critical wave band for any substance with which he is endeavoring to work and for the elements that make it up.

*Abstract of a paper read before the Louisville meeting of the American Association of Cereal Chemists, May 21, 1931.

Influence of Vitamin Content On Vegetable Freshness*

Abstracted by E. F. KOHMAN
Research Laboratories
National Canners' Association
Washington, D. C.

ONE would be likely to start a controversy in discussing what constitutes freshness in succulent vegetables unless the term were first defined. For our purpose, we will assign to this term the meaning which Napoleon had in mind when he realized that succulent vegetables were an essential to the welfare of his army, and when he offered a prize of 12,000 francs to the one who was most successfully able to conserve a certain property peculiarly characteristic of fresh vegetables and fruits. This property consisted of some dietary essential without which he was unable properly to nourish his troops.

The only dietary component known to be specifically characteristic of succulent vegetables and fruits is vitamin C.

With such a definition of freshness, canned turnip greens may be stated to be a fresh vegetable in every sense of the term. When we entered into a study of the vitamin content of canned turnip greens, we found them so rich in vitamin C and vitamin A that it elicited from us the desire to compare them with other fresh vegetables — particularly, those commonly eaten raw. Much to our surprise, on looking up the matter, we found no recorded test of the vitamin C content of head lettuce or celery, the two vegetables eaten to the greatest extent in the raw state. In view of the lack of data on these products, we subjected them to a study similar to that made on canned turnip greens.

Many people do not realize just how a test is made for any certain vitamin in a given food product. The experience of the workers on the subject of vitamins has made it possible to construct a diet which is adequate in supplying all dietary essentials except the particular vitamin in question. In the study of vitamin C, therefore, a so-called basal diet is fed which has all the known dietary components, including protein, carbohydrate, fat, minerals, and all of the vitamins except vitamin C. Guinea pigs on such a diet will invariably succumb to scurvy within an average period of three weeks, and, unless vitamin C is supplied, scurvy is 100 per cent fatal to guinea pigs within approximately a week thereafter. An adequate test period generally is accepted to be 90 days. Guinea pigs lived and grew at practically a normal rate when they were given each day 2 grams of canned turnip greens, in addition to having the vitamin-C-free basal diet before them all the time. However, at the end of the 90-day period, they had mild symptoms of scurvy. On 4 grams, scurvy was lacking except for mild symptoms in one animal. On 6 grams, there was no evidence whatsoever of scurvy.

In a similar experiment in which head lettuce was fed for a 90-day period, all of the animals had severe scurvy when receiving 15 grams of head lettuce per day in addition to the basal diet. Not all of them survived the 90-day period.

When 5 grams of celery stalks—bleached or green—was fed with the basal diet free from vitamin C, all of the guinea pigs had scurvy at the end of the experimental period, although with better growth results than was obtained with 15 grams of head lettuce. When the animals received 10 grams of bleached or green celery stalks, they were free from any symptoms of scurvy, but the growth was not quite so good as that made by animals receiving 2 to 4 grams of turnip greens.

The outcome of these experiments was rather surprising, not so much because of the richness of canned turnip greens in vitamin C, which compare very closely with canned spinach studied a few years previously, as because of the low vitamin C content of head lettuce and celery. These two vegetables commonly travel long distances and undergo fairly long storage periods before reaching the consumer. It is possible that this relatively long storage period after harvesting, along with any bruising of the vegetable cells in shipment, may have something to do with the relatively low vitamin C content found, in contrast with that of the canned turnip greens.

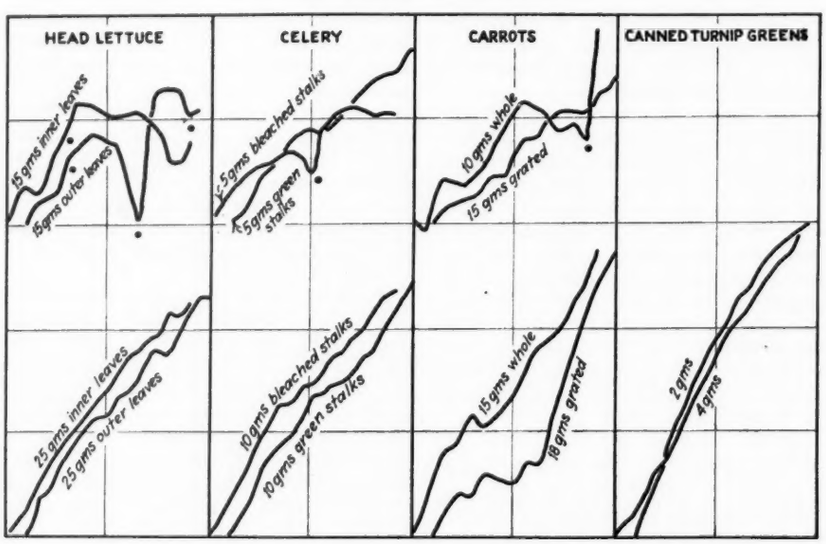
Carrots are served at times in salads in the raw state but not generally in a whole condition, since it is customary to shred or grate them. This shredding or grating is an intensified bruising, the effect of which tends to lower the vitamin C content. As a check we tested carrots both whole and shredded in feeding experiments, allowing the shredded carrots to stand one hour before feeding. Compared with the canned turnip greens, we found the raw carrots relatively low in vitamin C. The theory advanced on the effect of any bruising that will result in rupturing the vegetable tissue apparently was substantiated in this experiment with shredded carrots.

The growth curves of guinea pigs with these various quantities of vegetables fed daily, in addition to the basal diet lacking vitamin C, are given in the accompanying charts. Smaller and larger quantities of each vegetable also were fed. This is desirable in such experiments to help establish the critical values. For the sake of brevity, only the most significant data are given.

Although vitamin C is primarily what comes to mind in discussing freshness, we also made a study of the vitamin A and B content of canned turnip greens. The turnip greens are about the equivalent of carrots and spinach in vitamin A content, and these two probably are the highest of all our vegetables and fruits in this vitamin.

Vitamin B is now generally accepted to be composed of at least two fractions—designated as B_1 and B_2. Canned turnip greens cannot be considered as a significant source of vitamin B_1, but vitamin B_2 is present in fairly great concentration. Although head lettuce and celery are somewhat better than canned turnip greens in vitamin B_1 content, they are not potent sources of this vitamin.

Growth curves of guinea pigs over a 90-day feeding period when receiving various quantities of various vegetables daily in addition to the vitamin-C-free basal diet. Each square on a horizontal line represents 50 days, and, on a vertical line, 100 grams. An asterisk represents the death of an animal, apparently due to scurvy



*Abstracted from "The Vitamin Content of Some Common Vegetables," by Kohman, Eddy, and Gurin, *Industrial & Engineering Chemistry*, July, 1931.

ABSTRACTS OF CURRENT LITERATURE

MILDLY TOASTED WHEAT GERM—A POSSIBLE MERCHANDISABLE TABLE CEREAL. R. Hertwig. *Cereal Chemistry,* Vol. 8, pp. 226-228; May, 1931.

Wheat germ toasted at about 125 deg. C. to a light brown has a pleasing nutty flavor. The keeping qualities of the toasted germ are very good, both odor and flavor remaining sweet and pleasant throughout the period, which was equivalent to a storage time of one to two years. The high mineral and protein content and especially the outstanding potency of wheat germ in vitamins B, G, and E have won for it merited recognition as a valuable supplementary food. Production of the toasted germ on a factory scale should not involve any serious problems.

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A TOASTED WHEAT GERM SELF-RISING FLOUR—A POSSIBLE MERCHANDISABLE CEREAL. R. Hertwig. *Cereal Chemistry,* Vol. 8, pp. 229-231; May, 1931.

Tests of such a product are described and a typical formula is given, in which about seven parts of flour to one part of toasted whole germ are used. Such a product has several merchandising advantages over an ordinary self-rising flour: the vitamin B, G, and E content is greater; the baked product is more tasty; a byproduct of flour mills becomes valuable; cost of volume production is increased but slightly at most over ordinary self-rising flours.

* * *

SOLVENT EXTRACTION OF VEGETABLE OILS. A. E. Williams. *Industrial Chemist,* Vol. 7, pp. 161-165; April, 1931.

Disadvantages of solvent extraction have now been sufficiently overcome so that mechanical extraction of many seeds has been displaced. The more common oils obtained by solvent extraction include linseed, cottonseed, rapeseed, maize, soya-bean, palm-kernel, and copra. Types of extraction plants and methods of operation are described in detail. Several photographs of equipment used also are given.

* * *

RELATION BETWEEN THE VACUUM AND HEAD SPACE IN CANNED FOOD. Hideo Wada. *Journal of the Imperial Fisheries Institute,* Tokyo. Vol. 26, pp. 63-68; March, 1931.

Clarke, Clough, and Shostrom (*Pacific Fisherman,* May, July, 1923) showed that vacuum in canned salmon decreases as the head space increases. Wada shows that for three canned Japanese products, cooked beef, broad beans, and a vegetable mixture, the reverse is true; i.e., the vacuum increases as head space increases. The Japanese products are exhausted in boiling water for a constant time; the degree of vacuum will be greater when the mass of content is smaller, because the temperature reached is greater. Clarke et al. reached different conclusions because they assumed a constant temperature at the center of contents, irrespective of the head space, and in their experiments brought the center to a chosen temperature before sealing. The disagreement, therefore, is one of conditions chosen and not of factual conclusions.—*H. F. T.*

* * *

PREVENTION OF MOLD ON MARMALADES, JELLIES, AND FRUIT PASTES. R. Ripa. *Konserven-Ind.* pp. 171-173 (1931). [From *Chemical Abstracts,* Vol. 25, p. 2492; May 20, 1931.]

After jellification has begun, but before complete cooling, the surface of the product is coated with a thin layer of pectin solution. The pectin solution dries to a glaze which prevents mold growth. After complete cooling the container is sealed.

* * *

BLUE AND GREEN MOLDS ON ORANGES. G. B. Tindale and S. Fish. *Journal of the Department of Agriculture of Victoria,* Vol. 29, pp. 101-104 (1931). [From *Chemical Abstracts,* Vol. 25, p. 2492; May 20, 1931.]

The atmosphere of the packing shed and dust on the grader are important sources of infection of oranges with blue and green molds. Contact may cause infection of sound fruit. Optimum temperature for infection with both types of mold is 70-78 deg. F. Storage of fruit at 94 deg. F. for three days, which gives about 90 per cent control of the molds, is recommended.

* * *

CONTINUOUS FERMENTATION IN THE PRODUCTION OF LACTIC ACID. E. O. Whittier and L. A. Rogers. *Industrial and Engineering Chemistry,* Vol. 23, p. 532; May, 1931.

A method for continuous lactic-acid fermentation of the lactose of sweet whey has been devised and operated on both the laboratory and the plant scale. Lacto-bacilli are used in a fermentation tank equipped for close temperature control. A yield of 80 per cent of the theoretical has been obtained. Equipment and procedure are described. Modifications of this method should be applicable to other industrial fermentations.

LEGISLATION AFFECTING REFRIGERATED FOODS. Harden F. Taylor. *Ice and Refrigeration.* Vol. 80, p. 456; June, 1931.

No one can object to many provisions of state cold storage laws which provide for licenses, reports, inspections, and other requirements necessary to protect public health. But we find in nearly all of the laws other elements that arise from ignorance, false economic notions, and the all-too-common motive of trying to destroy legitimate business competition by legislation. The defensive and apologetic attitude of the cold-storage industry has been a contributing factor to the passage of some of the objectionable requirements. It is not recommended that cold-storage laws should be attacked. The laws are not a disease to be cured, but only the symptons; they show a popular ignorance and distrust of refrigeration. What is needed is enlightenment of the public to do away with this misunderstanding. This article will be valuable in interpreting data contained in the chart "What State Laws Say About Cold Storage," published in the May issue of FOOD INDUSTRIES.

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A PHYSICAL METHOD OF TESTING THE FRESHNESS OF RAW FISHES. M. Tanti, I. Hirose, and H. Wada. *Journal of the Imperial Fisheries Institute,* Tokyo. Vol. 26, pp. 79-86; March, 1931.

A familiar method of estimating the freshness of fish is to press the finger tips on the side of the fish and to note the ease with which depressions are made and the readiness with which they disappear. The authors attempt to standardize this test and make it quantitative by means of a spring instrument which presses a rounded plunger or ball against the flesh. The measurements are: force required to give a certain deformation, degree of return after deformation, and time required for a given degree of return after deformation. Good curves were obtained on specimens aged under laboratory conditions, but in commercial specimens indications were less convincing, because of variable factors of handling.—*H. F. T.*

* * *

FREEZING POINT OF MILK AND ITS APPLICATIONS. G. D. Elsdon and J. R. Stubbs. *Journal of the Society of Chemistry and Industry,* Vol. 50, pp. 135-141; April 17, 1931.

For all ordinary milks the variation of freezing points from herd to herd or even from animal to animal is extremely small. For normal milks the detection of 5 per cent (or even less) of added water is comparatively simple. The Hortvet freezing-point apparatus used for the work is described in detail (also see Association of Official Agricultural Chemists, "Methods of Analysis," second edition, p. 265).

BOOK REVIEWS

TREATISE ON LEATHER BELTING. By George B. Haven and George W. Swett, Massachusetts Institute of Technology, Boston, Mass. Published by Technical Composition Co., Cambridge, Mass., 1931 (for the American Leather Belting Association). 249 pp., 5¼x8 in.; illustrated; cloth. Price, $1.50.

COMPARATIVELY few days spent in visiting food manufacturing plants are needed to convince one that most managers, superintendents, and engineers know little and care less about their belt drives. This is true, even though poor drives are a source of constant operating expense and often cause serious loss through delays.

For this reason, this book by Messrs. Haven and Swett is a real achievement. It is brief. It is comprehensive. It is easily understood. It tells just about all that need be known by one who wishes to have efficient, economical, and dependable belt drives in his plant.

Of course, most of what this book contains has been said elsewhere, for the literature on the subject is voluminous. But I do not think it has been said as concisely or as simply. There is but one criticism to offer: the title is misleading. It is more than a "Treatise on Leather Belting." It should have been called a "Pocketbook of Belting Engineering." G.L.M.

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THE FARM BOARD. By E. A. Stokdyk and C. H. West. Published by The Macmillan Co., New York City, 1930. 197 pp., 5x7½ in.; cloth. Price, $2.

THIS work discusses the economic situation that led to the passage of the Federal Farm Board Act, the scope of the act, its means and methods of operation; and forecasts some of the possibilities of the act and the limitations it may encounter. It is a brief and popular summary of the question and will be helpful to those non-agricultural laymen whose business demands some understanding of the current farm situation, and its reactions on industry, trade, and finance. The authors are to be commended for their restrained treatment of such a controversial subject as farm relief and for the clarity of their conclusions.

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NEW MANAGEMENT IN CHAIN STORES. By H. R. Barnett, Editor *Chain Store Manager*. Published by Harper & Brothers, New York, 1931. 252 pp., 8¾x6 in.; cloth. Price, $3.50.

THE author states that he offers this book as a series of practical and workable suggestions for the management and development of personnel in any organization, where the heads of the business believe some of their success is dependent on what their men do and what they think. The problems treated in this book are quite the most important in the chain store business, according to a vice-president of a chain-store organization.

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KEYSTONE COAL BUYERS' CATALOG AND MINE DIRECTORY. 1931 Edition. Published by McGraw-Hill Catalog & Directory Co., New York City, 854 pp., 11x8½ in.; illustrated; artificial leather. Price, $15.

THIS directory gives complete information concerning the coal produced by every mining company in the United States and lists the names and addresses of the important officials of each company, including the sales manager or agent. Analyses are given for each seam of coal mined, in addition to a general discussion of the qualities of each coal. Railroads serving the mines are listed and maps of each state, showing the location of coal-producing localities, help to indicate to the buyer where his coal sources lie. This is a useful volume to all who buy coal in quantity.

* * *

MORE LIFE ELEMENTS FROM OUR SUCCULENT FOODS. Privately published by Baylis M. Dawson, Bowen Research Corp., 117 Liberty Street, New York City. 31 pp. Price, $2.

THIS booklet is a combination of discussions of nutritional science with formulas for the preparation of pureed vegetables. Orthodox nutrition chemists probably will not agree completely with the nutritional aspects of this booklet, but those who are interested in the production of pureed vegetables or diffusion extracts of vegetables will find it of interest.

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REPORT OF THE FOOD INVESTIGATION BOARD FOR THE YEAR 1930. By Department of Scientific and Industrial Research. Published under the authority of His Majesty's Stationery Office, Adastral House, Kingsway, London, W.C.2, 1931. 176 pp., 6x9⅝; 24 tables, 65 figures; paper. Price, 3s. net.

THIS report, a copy of which may be had from the British Library of Information, 551 Fifth Ave., New York City, includes the report of the Director of Food Investigation, personnel of the food investigation staff, and a bibliography of reports and papers published or submitted for publication during 1930.

The report of the director consists primarily of a compilation of papers prepared by members of his staff. These papers deal with the work done on meat as a general subject, fruits and vegetables, pork products, biological engineering, canning, fish, physical engineering, and work done by the Imperial College of Science and Technology on fruit and fruit products.

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GOVERNMENT PUBLICATIONS

DOCUMENTS ARE AVAILABLE *at prices indicated from Superintendent of Documents, Government Printing Office, Washington, D. C. Send cash or money order; stamps and personal checks not accepted. When no price is indicated pamphlet is free and should be ordered from bureau responsible for its issue.*

Tariff Commission Rules of Practice and Procedure. Issued by U. S. Tariff Commission. Second Edition, dated June 1, 1931, of rules of practice and procedure and laws relating to the Commission under the Tariff Act of 1930; 10 cents.

Fish and Other Marine Products. U. S. Tariff Commission Report to the U. S. Senate, No. 17, Second Series; 5 cents.

Edible Gelatin. U. S. Tariff Commission Report to the President, No. 13, Second Series; 5 cents.

Financial Structure of Cooperatives. Federal Farm Board Circular No. 4. Address by Stanley Reed before American Institute of Cooperation, Kansas State Agricultural College, Manhattan, Kan., June 11, 1931.

Oleomargarine Hearings. Hearings before Committee on Agriculture, House of Representatives, 71st Congress, 3d Session, on H. R. 15934, a bill to prohibit the purchase of butter substitutes for eating purposes. Issued in two parts.

U. S. Fish Farming Industries, by Clarence R. Lucas. Bureau of Fisheries Fishery Circular No. 2. A statistical review; 5 cents.

Fresh Oyster Market, by J. M. Lemon. Bureau of Fisheries Fishery Circular No. 3. Study of market in fourteen cities of the United States; 10 cents.

Damage by Insect Pests in U. S., by J. A. Hyslop. Mimeographed document from U. S. Department of Agriculture Bureau of Entomology. Estimate of damage by some of the more important insect pests.

Fig Insects in California, by Perez Simmons and others. U. S. Department of Agriculture Circular 157; 20 cents.

Some Common Disinfectants, by M. Dorset. U. S. Department of Agriculture Farmers' Bulletin 926, revision of May, 1931; 5 cents.

Glassine Bags. Mimeographed report of conference of the industry held under auspices of Department of Commerce, Division of Simplified Practice. Lists recommended stock sizes.

Chewing Gum. Bureau of Foreign and Domestic Commerce Foodstuffs Division mimeographed document giving general information and statistics.

Publications of Department of Commerce. List of publications issued by the Department, edition of May 15, 1931.

Wages and Hours of Labor in Slaughtering and Meat Packing Industry, 1929. Bureau of Labor Statistics Bulletin 535; 20 cents.

Food Specifications. Federal Standard Stock Catalogue. Board Specifications as follows: Condensed milk, canned lye, hominy, peanut-butter, biscuit (hard bread) or canned biscuit, canned oysters, canned tuna fish, and effervescent table water; 5 cents each.

Sub-Standard Definitions for Canned Foods. U. S. Department of Agriculture, service and regulatory announcements of the Food and Drug Administration No. 4. Contains official text of regulations fixing sub-standard definitions.

Yearbook of Agriculture, 1931. Bound volume of U. S. Department of Agriculture; $1.50. Reports results of research and service activities of the Department.

Confectioners' Distribution Costs, by S. L. Kedzierski. Bureau of Foreign and Domestic Commerce, domestic cost series No. 10; 10 cents. A study of the distribution cost problems of manufacturing confectioners.

PATENT DIGEST

Baking and Milling

Cereals Freed From Moldy Smell and Taste by Removal of Excess Moisture and Treatment With Ultra-Violet Rays—Edmund Von Horvath and Peter Vielwerth, Munich, Germany. No. 1, 811,869. June 30, 1931.

Traveling Oven With Two Horizontal Compartments, One of Which is Utilized as a Prover or Preliminary Treatment of Dough Before Passing Into the Baking Compartment—Johannes Hermanus Nieulant Pelkman, London, England, to Naamlooze, Vennootschap Bakovenbouw Voorheen H. P. Den Boer, Dordrecht, Netherlands. No. 1,811,962. June 30, 1931.

Method of Making and Baking Pan Bread in Twisted Loaf Form—Delmar M Binger to Zinsmaster Baking Co., Minneapolis, Minn. No. 1,812,769. June 30, 1931

Hopper and Chute System for Transferring Dough From Proving to Dividing Equipment—James Elliott Wilson, Samuel McConnell, and Campbell Brown, Belfast, Ireland. No. 1,800,920. April 14, 1931.

Mold Constructed to Give Product Characteristic Shape of Twist Loaf of Bread—Eugene Ingoglia, Brooklyn, N. Y. No. 1,801,160. April 14, 1931.

Endless Belt Conveyor Feed to Loaf Molder—Edward T. Parsons, Upper Montclair, N. J., to Thomson Machine Co., Belleville, N. J. No. 1,801,286. April 21, 1931.

Pastry Shells Formed by Forcing Mixture Between Relatively Movable Form Walls and Removing Excess Material by Suction—Harvey A. Beilgard, Los Angeles, Calif. No. 1,801,323. April 21, 1931.

Grain Cleaning Machine—Charles Steidle, Byrnesville, Mo. No. 1,801,392. April 21, 1931.

System of Conveyors for Feeding and Stacking Biscuits—Jacob Heinrich Ludwig Boettcher, to Devices Corp. of New Jersey, Orange, N. J. No. 1,801,997. April 21, 1931.

Ice Cream Cone Mold—Arthur A. Holland, Ontario, Canada. No. 1,802,017. April, 1931.

Beverages

Automatically Controlled Carbonating Apparatus—Leslie Stinson, Grand Forks, N. D. No. 1,811,218. June 23, 1931.

Adjustable Syrup Measuring Cup for Bottle-Filling Machine—Frank E. Fowler, Athens, Ga. No. 1,811,785. June 23, 1931.

Water Extract of Tea Treated to Cause Rapid Coagulation, Flocculation and Precipitation of Substances That Cause Cloudiness and Sediment—Raymond T. Metzger and Paul D. Potter, Winnetka, Ill., to Sprague, Werner & Co., Chicago, Ill. No. 1,813,120. July 7, 1931.

Continuous Coffee-Making Machine Operates in Automatic Manner—Alonzo Linton Bausman, Springfield, Mass. No. 1,813,872. July 7, 1931.

Canning and Glass Packing

Display Cover for Containers—Henry T. Reynolds, Lombard, Ill., to American Can Co., New York City. No. 1,811,967. June 30, 1931.

Combined Drainer and Syruper for Canning Machine Consisting of a Rotatable Wheel With a Plurality of Turrets—William De Back, San Leandro, Calif., to Sprague-Sells Corp., Hoopeston, Ill. No. 1,811,908. June 30, 1931.

Container Closure of the Wire-Opening Construction—Charles Stollberg to American Can Co., New York City. No. 1,811,983. June 30, 1931.

Can Labeling Machine With a Rotating Drum That Returns Labeled Can to Location Near Feeding Hopper—Christian Carl Krone, one-half to Alfred H. Murray, Momence, Ill. No. 1.812.007. June 30, 1931.

Hand-Operated Can Top Sealer—Charles M. Young, Ten Mile Township, Whatcom Co., Wash. No. 1,813,220. July 7, 1931.

Can-Seaming Machine—Edwin Forsberg, San Jose, Calif. No. 1,813,350. July 7, 1931.

Can Opening Device Constructed Similar to Hand-Operated Crown Bottle-Capping Machine—Cashly A. Henry, Dayton, Ohio. No. 1,813,620. July 7, 1931.

Confectionery and Chocolate

Double Section Mold for Making Chocolate Forms—Jens Johannes Jensen to Boggild & Jacobsen, Copenhagen, Denmark. No. 1,806,017. May 19, 1931.

Machine for Spinning Candy Into Cotton-Like Filaments—Buren Moad, Toledo, Ohio. No. 1,806,111. May 19, 1931.

Candy Wrapping Machine—Clarence C. Page, Portland, Ore. No. 1,807,045. May 26, 1931.

Confection Conveying Machine Designed to Transfer Confection Units From Conveyor Aprons to Flexible Plaques—Frederick W. Greer, Cambridge, Mass. No. 1,807,338. May 26, 1931.

Chewing Gum Consisting in Part of Beeswax, Pure Olive Oil, and Mastic Gum—Archie Pappadis, Norfolk, Va. No. 1,807,704. June 2, 1931.

Pineon Nut Sheller—James G. Baudino, Milford, Utah. No. 1,808,744. June 9, 1931.

Dairy and Egg Products

Hand-Operated Capper for Milk Bottles—Carl W. Goodwin, Wayland, Mass., to American Seal-Kap Corp., Long Island City, N. Y. No. 1,803,328. May 5, 1931.

Milk Can Cover With Vent and Spout Through Which Can May Be Emptied—Rollin M. Abernathy, Seattle, Wash. No. 1,803,825. May 5, 1931.

Egg Carton Designed to Prevent Renewal of Contents Between Time of Packing and of Purchase by Consumer Without Detection—Harry A. Inman, Newark, N. J. No. 1,804,166. May 5, 1931.

Copies of Patents

Complete specifications of any United States patent may be obtained by remitting 10c. to the Commissioner of Patents, Washington, D. C. Photostatic copies of foreign patents may be obtained at the same address, prices being forwarded on application.

Copies of patents should be ordered by number, as titles used in this digest seldom correspond with title of patent.

Milk Bottles Capped Mechanically by Being Raised Against Fixed Capping Unit—Clifford Morrow to H. H. Miller Industries Co., Canton, Ohio. No. 1,804,637. May 12, 1931.

Power Churn With Roll Box Arranged Inside Churn and Extending Through Packing Gland Secured to End of Churn—Arthur H. Boileau to Cherry-Burrell Corp., Cedar Rapids, Iowa. No. 1,805,464. May 19, 1931.

Cream Heated Approximately to Blood Heat at Atmospheric Pressure Before Put Into Sterilizing Apparatus—Samuel Grasse, Glasgow, Scotland. No. 1,801,152. April 14, 1931.

Heat Developed by Pressure Action Sterilizes Cheese—John H. Baumgartner to Charles and Henry Doering, Chicago, Ill. No. 1,802,455. April 28, 1931.

Round-Cornered Container for Shipping Eggs—James W. Wilkinson, Marion, Ind. No. 1,803,047. April 28, 1931.

Fruits and Vegetables

Vegetables Fed to Rotary Cutting Knife by Screw Feed Operating Through Horizontal Plane—Charles B. Rohland, Barberton, Ohio. No. 1,803,769. May 5, 1931.

Pail With Enlarged Open Top and Drain Aperture in Bottom for Picking Fruit—Arthur J. Krantz to the Reeves Manufacturing Co., Dover, Ohio. No. 1,805,287. May 12, 1931.

Asparagus Tips Produced by Machine for Cutting Butts From Stalks of Asparagus in Double Holding Racks—Thomas Gill, Jersey, Calif. No. 1,804,928. May 12, 1931.

Fruit Dipper for Use With Peeling Machine—Carl W. Shatto, Sebastopol, Calif. No. 1,805,380. May 12, 1931.

Fruit Sterilized in Refrigerator Cars by Discharging Sterilizing Gas Into the Car So That it Will Follow Air Currents Set Up by Method of Refrigerating Car—Lester W. Collins to Ansul Chemical Co. of California, Modesto, Calif. No. 1,806,012. May 19, 1931.

Meat Packing

Meat Fed to Slicing Machine by Means of Screw-Thread Propeller—Ernest Baseley Scott, Rhyl, North Wales, and John Henry Davies, London, England. No. 1,798,038. March 24, 1931.

Surfaces of Meat Cutting Blocks Made Smooth by a Suspended Motor-Operated Saw Operating in a Horizontal Plane—Oskar Girrback, Long Island City, N. Y. No. 1,800,521. April 14, 1931.

Meat Grinder Cleaned by Brush With Central Shaft Fitted to Engage With Driving Shaft of Grinder—August P. Erickson, Billingham, Wash. No. 1,801,547. April 21, 1931.

Sugar and Molasses

Sugar Juices Clarified by Mechanical Filtration as They Leave Screens of Crushing Mills—Robert C. Campbell, Millburn, N. J., to Oliver United Filters, Inc., San Francisco, Calif. No. 1,803,380. May 5, 1931.

Cane Stalks Shredded by Disks With Shearing Knives Preparatory to Extraction of Juice—William Henry Morgan, Alliance, Ohio, to the Morgan Hurrycane Co., New York City. No. 1,804,797. May 12, 1931.

Raw-Sugar Syrup Content Reduced by Storing Sugar in Air-Conditioned Chamber to Aid Crystallization Before De-syruping With High-Velocity Centrifuge.—Julien Bergé to Raffinerie Tirlemontoise Société Anonyme, Tirlemont, Belgium. No. 1,809,807. June 9, 1931.

General Equipment

Combination Refrigerator and Showcase With Refrigerant Container Mounted on Rollers and Capable of Movement Into and Out of Refrigerating Compartment—Philip H. Christopher, Fairmont, W. Va. No. 1,804,914. May 12, 1931.

Freight Car Pusher With Double Leverage Effect—Desmond B. Brooks, Haxtun, Ohio. No. 1,805,388. May 12, 1931.

Rotary Extractor With Stationary Sleeve Containing Trunnion Fitted With Pair of Conduits Which Have Communication With a Liquid Line and a Vapor Line Connected With Sleeves About Trunnion—Oscar H. Wurster and Albert M. Smith to Wurster & Sanger, Inc., Chicago, Ill. No. 1,807,232. May 26, 1931.

Container Unit for Sharp Freezing in Ice Cream Cabinet—Lloyd G. Copeman to Copeman Laboratories Co., Flint, Mich. No. 1,807,587. June 2, 1931.

Refrigerated Storage and Display Counter—William P. Whitcher to Dry-Kold Refrigerator Co., Niles, Mich. No. 1,808,443. June 2, 1931.

Apparatus for Irradiating Liquid by Repeatedly Circulating Liquid Through Irradiating Lamp Chamber—Charles Everett Bills to Mead Johnson & Co., Evansville, Ind. No. 1,808,760. June 9, 1931.

Refrigerating Apparatus for a Secondary Refrigerator—Gardner Tufts Voorhees, Boston, Mass. No. 1,808,910. June 9, 1931.

Horizontal Boiler With Super-Heater—Charles W. Gordon, Pleasantville, N. Y., to the Superheater Co., New York City. No. 1,808,951. June 9, 1931.

Refrigerating Apparatus Consisting of Spaced Cylinders Joined at Ends to Form a Refrigerant Expansion Chamber Between the Two Cylinders—John C. Scovel, Jr., to the Creamery Package Mfg. Co., Chicago, Ill. No. 1,809,075. June 9, 1931.

Sponge Rubber Wiping Rolls for Labeling Machines—Charles H. Oslund, Worcester, Mass., to the Liquid Carbonic Corp., Chicago, Ill. No. 1,810,619. June 16, 1931.

Pneumatic Car-Pulling Machine—Andrew E. Rothgarn to Samuel C. Clow, Minneapolis, Minn. No. 1,810,680. June 16, 1931.

Dating Attachment for Packaging Machine—Maximilian H. Kern, Richmond Hill, N. Y., to Roberts Numbering Machine Co., Brooklyn, N. Y. Nos. 1,811,358 and 1,811,359. June 23, 1931.

NEW EQUIPMENT FOR FOOD MANUFACTURERS

Lift Truck for Refrigerator Car Work

THE 1¾-ton electric lift recently added by Elwell-Parker Electric Co., Cleveland, Ohio, to its line of equipment has a four-wheel steer, a short turning radius, and an over-all width of 29 in. These features make possible its operation through the narrow doors and within the limited interior of refrigerator cars. Furthermore, the net weight of this truck, 2,350 lb., plus its maximum carrying load of 3,500 lb., is declared to be within the limit that can be safely supported by the slat false floors usually found in refrigerator cars.

In a performance test at the plant of a cheese manufacturer a refrigerator car was unloaded in 30 min. by the use of one of these trucks. Usually 50 to 60 min. was required by five men with hand lift trucks to do the same work.

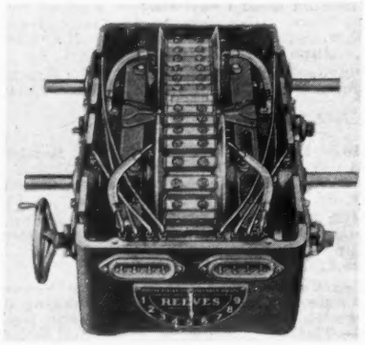
The accompanying illustration shows the use of one of these trucks in loading a car with cartons of mayonnaise; 20 cartons of 4 gal. each per load.

New Inclosed Variable-Speed Transmission

LUBRICATION of all bearings through force feed fittings located in recessed panels is one of the features of the new type variable-speed transmissions announced by Reeves Pulley Co., Columbus, Ind., within the last six months. In this latest addition to the line of Reeves transmissions the internal operating parts are inclosed in a compact cast-iron case to give protection from water, live steam, fumes, or abrasive dust.

U-shaped recesses in the sides of the bottom section provide means for removal of operating units for replacement or repair purposes. Minor adjustments, replacement of V-belt, and inspection are provided for by the removable lid on the cover section.

This design is reported as being

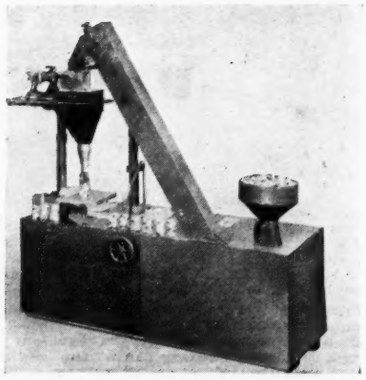


available in six sizes, ranging from fractional to 10 hp. in all speed ranges and suitable for mounting on floor, ceiling, or in vertical position. The cover section provides for adjustable motor rails and crossrails on which a motor unit of any design or type or an auxiliary countershaft unit may be mounted to give the desired speed control on the operating machine.

Elevator-Type Conveyor And Measuring Machine

TO SPEED up accurate package weighing of nuts, sweet meats, and the like, the illustrated aid to packaging in transparent containers has been added to the "Packomatic" line manufactured by J. L. Ferguson Co., Joliet, Ill.

The elevator-like feed conveyor elevates the material in a uniform manner to a point above a rotatable reel device containing pockets. When a pocket has received the prescribed quantity for a package, a release is tripped, and the reel revolves to bring the next pocket into position and to discharge the filled one.

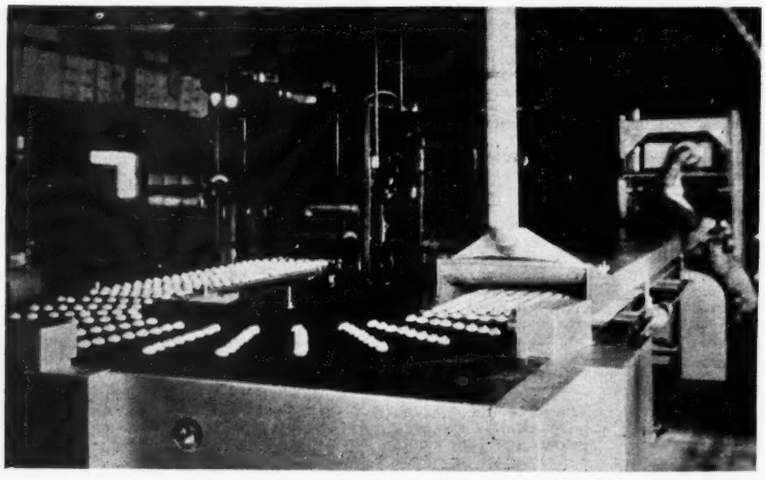


This machine is shown as being used in conjunction with a check-weighing scale to assure correct weight per package. Claim is made that this conveyor-feed can be attached to any one of three different size scales with a range of package weights from ¾ oz. to 3 lb. On small-weight packages it is supposed to have a speed up to 35 packages per min. and on packages of ½ lb. and greater a speed of 20 to 30 per min. with a deviation of not more than ⅛ oz. in weight per package.

The conveyor belt is adjustable in construction to meet requirements of product and plant layout. Installation may be fixed or portable.

Turntable Conveyor for Use In Restricted Space

A CONVEYOR unit that gives straight-line type of production performance in a short length floor space has been developed by the National Equipment Co., Springfield, Mass. The unit consists of a circular disk of fabric mounted on a table in such a manner that it is rotated by rolls. In this way it changes the direction of travel of the units being processed, so that their movements are continuous.



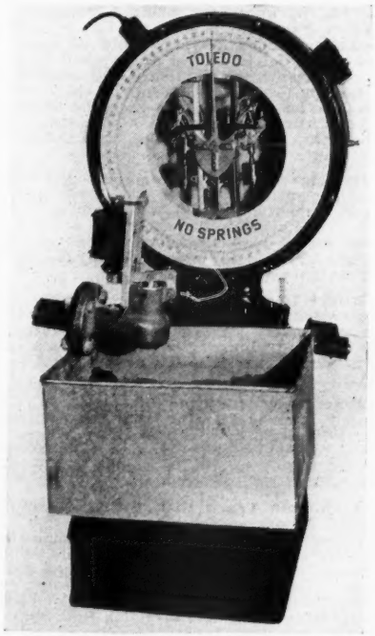
This turntable installation has found specific application in the bakery industry in connection with confection topped cakes or cookies. After small cakes have passed through a topping depositor as much as 100 ft. of conveyor travel should be provided to fit them for further handling. In many baking plants such a stretch of floor space is not available for a true straight-line installation. By means of this unit the cakes may have their direction of travel changed, after they have passed through the depositing machine, so that they pass in a continuous manner to a parallel conveyor installation that provides for proper treatment of the icing or topping preliminary to further handling of the finished cakes.

This unit is designed for use in connection with candies and other food products as well as the bakery goods shown in the illustration.

A Solenoid-Operating Weighing Valve

DESIGNED for use in electrical cut-off weighing installations the solenoid-operated valve developed by Toledo Precision Devices, Inc., Toledo, Ohio, is said to be fully effective in operation.

The valve seat is placed at the outlet so that all flow ceases as soon as the valve closes. As shown in illustration, this valve is utilized to obtain exact weight in a filling operation. The scale is equipped so that the weight indicator intercepts a beam of light directed onto a photo-electric cell when the desired weight has passed through the valve.



Claims are made that the valve operates effectively in any filling operation involving exact weight. It comes in ½-, 1-, and 2-in. sizes and is advocated for use in any liquid packaging or mixing operation.

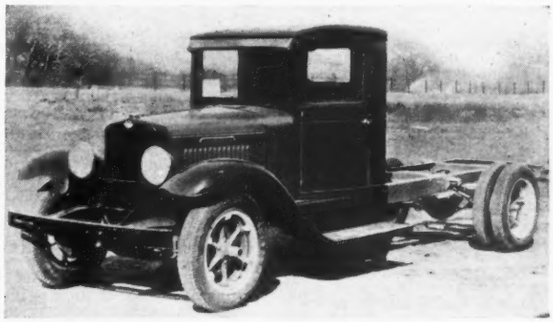
New 1½-Ton Capacity Trucks

TWO 1½-ton trucks, models A-2 and B-2, have recently been added to the line of commercial trucks manufactured by International Harvester Co. of America, Inc., Chicago, Ill. Both trucks use the same units throughout with the exception of the rear axles and transmission. In model A-2 the rear axle is of the single-speed, spiral-bevel drive type and the transmission has four speeds with one reverse. Model B-2 has a two-speed axle, which, with the three-speed transmission, gives six forward and two reverse speeds.

Model A-2 can be obtained in 136- or 160-in. wheelbase length, whereas model B-2 is built only in the 136-in. wheelbase length. Each has a body allowance of 1,200 lb. and a maximum carrying capacity of 4,200 lb. for hauling and delivery service.

The engine of each model is of the four-cylinder, L-head type with 3⅜-in. bore and 4½-in. stroke, piston displacement of 185.8 cu.in., maximum power of 39 b.hp. at 2,400 r.p.m., and maximum torque of 120.5 lb.-ft. at 1,000 r.p.m.

A gear-type, gear-driven oil pump provides pressure feed lubrication to all main, camshaft, connecting rod, and wristpin bearings. Engine efficiency and fuel economy are claimed by virtue of the balanced-flow type carburetor, perfected manifolding, and a special cylinder head that has a compression ratio of 4.6.



MANUFACTURERS' PUBLICATIONS

Steel-Framed Refrigerated Cases—In illustrated folders the Hussmann Refrigerator Division, Allied Store Utilities Co., St. Louis, Mo., announces its line of electrically welded heavy steel frame display cases and refrigerated counters.

Boiler Water Conditioning — A 16-page booklet devoted to boiler water problems and conditioning of water boiler has been prepared by the Elgin Softener Corp., Elgin, Ill.

Texrope Drive—A light-weight, low-priced drive of the Texrope type is described in a release by the Allis-Chalmers Manufacturing Co., Milwaukee, Wis. The steel sheaves are die-pressed.

Rotex Industrial Screens — Screens for grading and sifting salt, cereals, cocoa powder, and the like are fully described and illustrated in catalog No. 83 of the Orville Simpson Co., 1230 Knowlton St., Cincinnati, Ohio.

Special Paint for the Food Industries—Cheesman-Elliot Co., Inc., 639 Kent Ave., Brooklyn, N. Y., in illustrated leaflets announces and recommends application for its fume-, heat-, damp-, and cold-resisting paint for industrial use in food manufacturing.

Short Center Drive for Flat Belts — Equipment designed to give uniform belt tension is described and illustrated in a 40-page booklet prepared by the Rockwood Mfg. Co., Indianapolis, Ind. Photographic and diagrammatic drawing illustrations show the applications of the Rockwood base with its pivot mounting for motors.

Electric Fans — Stationary, oscillating, ceiling, and ventilating fans operating on alternating and direct current are illustrated and described in Bulletin No. 41 published by the Century Electric Co., 1806 Pine St., St. Louis, Mo.

Electrical Refrigeration — Refrigerating expansion coils for use in display cases, coolers, and storage boxes are discussed and illustrated in two booklets of 8 pages each, prepared by the Larkin-Warren Refrigerating Corp., Atlanta, Ga. One of the booklets is devoted to equipment for ammonium requirements.

One and One-Half Ton Trucks — The chassis of the new International Harvester Model A-2, 1½-ton motor truck, is described in an illustrated leaflet prepared by the International Harvester Co. of America, 606 South Michigan Ave., Chicago, Ill.

Design Data for Expansion Loops — A simplified method for designing expansion loops made with elbows and straight pipe, is found in Bulletin 166 of the Tube-Turns, Inc., Shelby St. and Goss Ave., Louisville, Ky.

Vacuum Filling and Screw Capping Equipment—In Bulletins Nos. S-2A and S-3, the Pneumatic Scale Corp., Ltd., Norfolk Downs, Mass., calls attention to its machinery and other equipment incidental to high-speed vacuum filling and automatic application of all types of screw caps.

Air Coolers — Bulletin No. 131 of the Vilter Manufacturing Co., Milwaukee, Wis., devotes 8 pages to the various types of its aero coolers and their application for refrigeration purposes in the many types of food manufacturing and processing factories.

Seamless Tubes and Pipes From Nirosta Alloys—In a 56-page well illustrated booklet, the Babcock & Wilcox Tube Co., Beaver Falls, Pa., gives physical and chemical specifications, corrosion-resistant tables, chart studies, and photographs of large-scale installations of these tubes.

Rules and Regulations for Exhibitors at 1933 World's Fair—A 13-page booklet, entitled "A Century of Progress," has been prepared by the Committee on Rules and Regulations for Exhibitors at the Chicago International Exposition of 1933. Address Department of Exhibits, Administration Building, Burnham Park, Chicago, Ill. Full information is given regarding the exposition and the preparations made for it.

Magnet for Removal of Tramp Iron—In an 8-page illustrated booklet, known as Bulletin 910, the Electric Controller & Mfg. Co., Cleveland, Ohio, describes and shows uses for its separator magnet. Other booklets as units of a loose-leaf catalog include Bulletin No. 1105, entitled Push-buttons, Standard, Vaporproof and Explosion Proof. Bulletin 1088 deals with motor

field rheostats and relays for adjustable-speed direct-current motors. Bulletin 1062 is devoted to type ZHS 2300-volt magnetic contactors for a.c. motors of the non-reversing and reversing types, and Bulletin No. 1042-G deals with 110- to 550-volt automatic compensators for a.c. squirrel-cage and synchronous motors.

Fine Grinding Pulverizers—Dustless pulverizing without separating or bolting is claimed for the Mikro-Pulverizer, described in an illustrated loose-leaf catalog prepared by the Pulverizing Machinery Co., 30 Church St., New York City.

Foil Removed From Bottles — Different model units and list of repair parts are identified and illustrated in a folder leaflet prepared by the Edward Ermold Co., Hudson, Gansevoort and 13th Sts., New York City.

Nickel-Clad Steel Plates—Lukens Nickel Clad Steel Plates made by hot-rolling steel and nickel are described and illustrated in a folder published by the Lukens Steel Co., Coatesville, Pa.

Air-Conditioning—In Bulletin No. 384, B. F. Sturtevant Co., Hyde Park, Boston, Mass., shows various views and lists specifications for its suspended unit cooler, and in catalog No. 383 shows views and gives data tables for its humidifilter.

Proofing and Fermentation Cabinets for Experimental Baking — The Bailey Model Dispatch Proofing and Fermentation Cabinet with cooling chamber, automatic temperature control, and humidity system is illustrated and described in Bulletin No. 650 prepared by the Dispatch Oven Co., 622 Ninth St., S.E., Minneapolis, Minn.

An Aluminum Valve—The William Powell Co., 2521 Spring Grove Ave., Cincinnati, Ohio, in an illustrated booklet describes its aluminum valves and fittings, shows installations using aluminum valves, and gives the constituents and physical properties of three aluminum alloys used in the manufacture of valves and fittings.

Motor Trucks—Two illustrated booklets entitled "International Trucks for Bakers" and "Ambassadors of Business," showing the various models and their use, have been published by the International Harvester Co. of America, 606 South Michigan Ave., Chicago, Ill.

Stainless and Heat-Resisting Alloy Steels —In an attractively bound booklet, the United States Steel Corp., Frick Building, Pittsburgh, Pa., gives properties, uses, and composition of the various stainless steels and gives illustrations showing their use in numerous fabricated forms.

Automatic Water Stills—Catalog B, compiled by the Barnstead Still & Sterilizer Co., Inc., Lanesville Terrace, Forest Hills, Boston, Mass., is divided into seven loose-leaf sections, devoted to water-distilling equipment for various industrial and domestic uses.

Spray Drying—In an 8-page illustrated booklet, the Western Precipitation Co., 1016 West 9th St., Los Angeles, Calif., announces that the Peebles Spray Drying System for producing a powder in one step from solution or suspension.

Automatic Control Valve—Motor-operated types of automatic control valves for gas and air, for oil and air, and for steam, water, air, and gas, and recording instruments are described and illustrated in catalog No. 2002 prepared by the Bristol Co., Waterbury, Conn.

Ammonia Steam-Valve Control — Illustrated Bulletin No. 530 devoted to high economy valves for automatic control of ammonia feeds is available for the Vilter Mfg. Co., Milwaukee, Wis.

Cleanser for Dairy Tin Plate—In an illustrated leaflet the Diversey Mfg. Co., 53 West Jackson Blvd., Chicago, Ill., lists uses for its Protex Metallum material and lists test results incident to its use.

Vacuum Milk Dryers—A 52-page bound booklet known as bulletin No. 256, tenth edition, is devoted to illustrations, specifications, and suggested uses for the various types of milk dryers manufactured by the Buffalo Foundry & Machine Co., 1635 Filmore Ave., Buffalo, N. Y.

Milk Bottle Protectors—A device for protecting milk after delivery, manufactured by the Floyd Manufacturing Co., 13th and Hill Sts., Harrisburg, Pa., is described in an illustrated leaflet.

Motion Pictures of Microorganisms—In the 24-page booklet published by Bausch & Lomb Optical Co., Rochester, N. Y., Cinéphotomicrography and its application are discussed in connection with illustrations showing equipment and developed films. A 3-page bibliography is included.

High-Capacity Meat-Slicing Machines—Bulletin B-15, published by the Link-Belt Co., 300 West Pershing Road, Chicago, Ill., illustrates and lists the repair parts for industrial capacity meat chippers and bacon slicers. A separate leaflet illustrates and gives detail specifications of cutting machines designed for the preparation of fresh retail cuts.

Glass Containers—A 500-page reference-book type of catalog, prepared by the Owens-Illinois Glass Co., Toledo, Ohio, is divided into ten sections. Each section is devoted to actual photographs, illustrations, and detailed specification descriptions of various glass containers applicable to specific uses. The book is of loose-leaf type, well indexed, and bound in a serviceable heavy board back covered with a moisture-resisting cover.

Frequent-Stop Delivery Trucks—In an illustrated leaflet the Divco-Detroit Corp., 2435 Merrick Ave., Detroit, Mich., announces and describes feature points of its new truck designed for house-to-house deliveries.

Air-Conditioning — Equipment used to maintain constant temperature and humidity in food factories is described and illustrated in a leaflet prepared by the Niagara Blower Co., 95 Liberty St., New York City.

Horizontal Centrifugals — Centrifuges whose basket operates through a vertical plane and that may be used for extracting or decanting purposes are described and illustrated by photographs and diagrammatic drawings in a 12-page booklet published by the Sharples Specialty Co., 23d and Westmoreland Sts., Philadelphia, Pa.

Manufacture of Carbonic Ice—Installations and units of equipment for making carbonic ice are noted and fully illustrated by photographs in Bulletin No. 124-A published by the Frick Co., Waynesboro, Pa.

Display and Storage Cases for Ice Cream —In an illustrated leaflet the Grand Rapids Cabinet Co., Grand Rapids, Mich., announces and describes its mechanically refrigerated Zeroviz display and storage cases designed as an aid in merchandising ice cream.

Vacuum Pan Handbook—In a 32-page booklet, known as Bulletin 726, the Pfaudler Co., Rochester, N. Y., gives methods of making various kinds of preserves, tomato paste, and concentrated fruit juices; also describes and illustrates equipment applicable to these processes.

Leakproof Worm Gear Reducers—In an illustrated release, Foote Bros. Gear & Machine Co., 111 North Canal St., Chicago, Ill., announces and describes its new oil leakproof vertical worm reducer.

Window-Washing Equipment—In a leaflet illustrated by photographs, the Cleveland Electric Tramrail Co., Wickliffe, Ohio, describes its system for making window washing safe as well as inexpensive.

Recording Instruments—Illustrated leaflet L-20512, published by the Westinghouse Electric & Manufacturing Co., Newark Works, Newark, N. J., describes and gives uses for its type A recording instrument.

Industrial Uses of Air in Motion—In a 26-page loose-leaf booklet containing Bulletins Nos. 9, 16, 17 and 18, the Niagara Blower Co., 95 Liberty St., New York City, gives specifications, illustrations, and data charts regarding the use and application of its fan coolers and standard cooling coils.

Consumer Analysis of the Greater Milwaukee Market for 1931—The Journal Co., Milwaukee, Wis., has compiled and published a 74-page booklet showing consumption and distribution of various food products by brands for the year 1930.

Gluten Developer for Baking Industry—Maturo, designated as a "gluten developer," is described in a 12-page booklet prepared by the American Bakery Materials Co., Menomonie, Wis. Formulas for its use in sponge doughs and in straight doughs are included.

Heat Transfer in Laboratory Ovens—A presentation of the principles of good oven design is given in a 10-page illustrated booklet published by the Freas Thermo-Electric Co., 1206 South Grove St., Irvington N. J.

Steam Specialties — Thermoflex heating specialties manufactured by the Grinnell Co., Providence, R. I., are described and illustrated in a 20-page booklet.

Glass-Lined Dairy Equipment — Glass-lined dairy vats with glass-coated coils are described and illustrated by photographs and diagrammatic drawings in a leaflet prepared by the Glascote Co., 20900 St. Clair Ave., Euclid, Ohio.

Centrifugal Pumps—A 16-page booklet, known as Bulletin 1647, containing photographic and diagrammatic illustrations and head capacity tables for the type SSU centrifugal pumping units has been prepared by the Allis-Chalmers Manufacturing Co., Milwaukee, Wis.

Rotary Pumps—Loose-leaf catalog No. 58 published by the George D. Roper Corp., Rockford, Ill., contains 102 pages devoted to photographic illustrations, diagrammatic drawings, graphic chart studies, and data-table specifications on hand- and power-operated rotary pumps.

Training Salesmen—The Visual Way to Train Salesmen is a 16-page booklet prepared by the Visual Training Corp., Cleveland, Ohio, as an aid to a solution of the personnel problem of training grocery sales employees.

Arc-Welding Supplies—In a 20-page catalog booklet, the Lincoln Electric Co., Cleveland, Ohio, illustrates, describes, and gives prices on supplies and materials used in arc welding.

One-Way Clutch — The Pitter one-way clutches marketed by the Universal Gear Corp., 327 South La Salle St., Chicago, Ill., are illustrated by diagrammatic drawings and described in detail in a 4-page leaflet.

The Story of Agriculture—This 12-page supplement to the booklet entitled "A Century of Progress," prepared by the Agricultural Division of the Department of Exhibits, Administration Building, Burnham Park, Chicago, Ill., illustrates the dramatic presentation of One Hundred Years of Agriculture to be shown at the Chicago World's Exposition in 1933.

Inverted Rotary Converters—Roth Bros. & Co., 1400 West Adams, Chicago, Ill., in a loose-leaf catalog release, illustrate, and describe the Century Inverted Rotary Converter.

Duplex Piston Pumps—In a 4-page specification sheet known as W-112-F6, the Worthington Pump & Machinery Corp., Harrison, N. J., describes its horizontal, duplex, piston pump, Type S.P., with liquid ends for 450 to 600 lb. maximum pressure. Hot oil pumps, Type S.P., announced in 4-page specification sheet, W-112-F9, are designed for hot feed or hot flash service at temperatures up to 700 deg. F.

Evaporated Milk Reprints—The Evaporated Milk Association, 203 North Wabash Ave., Chicago, Ill., has prepared reprints of an article by Frank E. Rice on "Recent Developments in the Use of Evaporated Milk in Infant Feeding." Also one by Prof. R. M. Washburn, entitled "The Sweet Taste That Comes From the Heating of Milk."

All-Denominational Postage Machines—By photograph and printed release, the Ohmer Fare Register Co., Dayton, Ohio, announces a new postage machine designed and perfected to stamp and record postage of all classifications quickly and accurately. It designates on the stamp in three colors the date issued, zone to which the shipment is being made, weight, class of postage, and other data required by the Post Office Department.

Hydrogen-Ion Measurements—A 48-page booklet entitled "Notes on Hydrogen-ion Measurements," issued by Leeds & Northrup Co., Philadelphia, Pa., is a small text-book devoted to the description of apparatus employed for measuring hydrogen-ion concentration or pH values.

Direct Dryer and Roaster—In an 8-page illustrated booklet, the Fitz Water Wheel Co., Hanover, Pa., describes its equipment for direct drying or roasting of grain, peanuts, coffee, and similar agricultural products.

Emergency Lighting System—An illustrated loose-leaf catalog release prepared by Roth Bros. & Co., 1400 West Adams St., Chicago, Ill., describes and shows schematic wiring diagram of its model 7385 GTS emergency lighting system.

Aluminum Truck Bodies—The Aluminum Co. of America, New Kensington, Pa., has prepared an 88-page illustrated booklet, in which Part 1 contains operating and weight-saving data on truck bodies of Alcoa aluminum. Part 2 is devoted to design and manufacture of aluminum truck bodies. Various types of truck bodies for a variety of uses are dealt with.

Truck Operation Recording — An illustrated folder entitled "Key to Your Profit" has been prepared by the Ohmer Fare Register Co., Dayton, Ohio, to describe and give use of its Recordograf, which records on a tape the activities of the truck to which it is attached, the time of starting, stopping, idling, and period of time in operation.

NEWS OF THE MONTH

Vitamin Claims Receive Government Scrutiny

FOOD and drug manufacturers may have to take a few more lessons in the *A B C*'s (and *D*'s) of vitamin theory if government scientists find that the claims made on labels regarding the health-giving properties of vitamins are too extravagant. The Food and Drug Administration is now extending its experimental research in vitamins begun four years ago, but curtailed until recently by lack of funds.

Dr. E. M. Nelson will direct the inquiry expected to restrain food processors whose statements regarding the volume or value of the vitamin content of their products are either false or misleading. Although the Administration cannot censor advertising, it can bring manufacturers to task for representations made either on the label or the leaflet that frequently accompanies packaged foods and drugs.

Even if the manufacturer has correctly stated the quantity of vitamins present in his product he is liable to prosecution if he makes claims regarding the properties of any or all of these elements that cannot be substantiated by scientific proof.

The research also will be directed to uncovering more information about the nature and behavior of the vitamins themselves, so that it may be possible eventually to establish a more accurate index of their nutritive value.

Dairy Science Association Meets on Pacific Coast

PRECEDED and followed by an automobile tour of Pacific Coast dairy centers, the American Dairy Science Association held its 1931 meeting at the University of California Farm, Davis, Calif., on July 14 and 15. Nutritional and feeding experiments were frequent subjects in the dairy production section, while improvements in quality and quality control seemed to underlie the discussions of the dairy manufacturers' group.

One of the most significant papers presented was that by B. H. Thomas, of Iowa State College, and Florence L. MacLeod, of Columbia University, "Studies in Increasing the Anti-Rachitic Potency of Cows' Milk." These authors carried out a series of feeding experiments at the Walker-Gordon Farms in New Jersey. Ultra-violet irradiated yeast and ultra-violet irradiated ergosterol were fed to cows in quantities as high as 100,000 rat-units a day, and were responsible for increasing the anti-rachitic value of the milk as much as sixteen times. Clinical experiments by Drs. Hess, of New York, and Wyman, of Boston, showed that milk from these specially fed cows was both prophylactic and curative for infantile rickets. The increase in potency per rat-unit fed was greater for yeast than for ergosterol.

J. C. Marquardt and A. C. Dahlberg told of experiments on pasteurizing and cooling in the same vat, and its effect on the cream layer volume. The rate of cooling has more effect on creaming than agitation; rapid cooling produces the best cream layer volumes. In the equipment used, the milk was cooled from 143 to 40 deg. F. in 25 min. or less. The entire heating, holding, and cooling period required about an hour.

An alkaline reagent to replace sulphuric acid in the Babcock test was described by W. E. Peterson, of the University of Minnesota. The reagent consists of a salt of salicylic acid, a hydroxide, a carbonate, a higher alcohol, and water. The reagent gives a rapid and clear volumetric test on all dairy products, is comparatively harmless to hands, clothing, and plumbing, and acts as a cleanser of the test bottle.

COMING EVENTS

AUGUST

3-6—National Association of Retail Meat Dealers, West Baden, Springs Hotel, West Baden, Ind.

11-14—International Apple Association, West Baden Springs Hotel, West Baden, Ind.

18-20—National Food Distributors Association (formerly Wagon Men's Distributing Association) McAlpin Hotel, New York City.

26-30—United States Fisheries Association, aboard S.S. "Tuscania," cruising from New York.

27—American Cranberry Growers' Association, Pemberton, N. J.

31-Sept. 4—American Chemical Society, Statler Hotel, Buffalo, N. Y.

SEPTEMBER

21-26—American Bakers' Association, Hotel Sherman, Chicago, Ill. (Also Allied Trades of the Baking Industry, National Association of Bakers' Supply Houses.)

Effective Sept. 6, 1931, the address of FOOD INDUSTRIES will be 330 West 42d St., New York City

Mayonnaise Jar Capacities Reduced to Five

CAPACITIES of glass containers for mayonnaise, salad dressing, and sandwich spread were reduced from 25 to 5 by approval of the simplified practice recommendation at a meeting of all interests in the industry held in Washington on June 30 under auspices of the Bureau of Standards.

The five sizes recommended by the conference are the 3 fluid ounce, the one half-pint or 8 fluid ounce, the pint, the quart, and gallon. It is to be noted that this simplification program will not affect the distinctive shapes of containers in use by different manufacturers.

The conference authorized also the appointment of a standing committee to be composed of representatives of all elements of the industry. President McKeldin of the Mayonnaise Manufacturers' Association will appoint this committee at an early date. A recommendation to the industry that contents be indicated according to liquid measure was voted at the conference.

Subject to the written approval by the industry, the simplification program will become effective for new production on Jan. 1, 1932, and for the clearance of existing stocks on July 1, 1932.

Sweet Potatoes May Yield Tasteless Stamp Glue

A TASTELESS dextrin inoffensive to lickers of postage stamps will have sweet potatoes as its source if experiments conducted by the Bureau of Chemistry and Soils of the U. S. Department of Agriculture are successful. In an oral statement reported in the *United States Daily*, H. S. Paine, Bureau chemist, told of efforts to obtain such dextrin from starch-producing plants native to the United States.

The substance used at present comes from the lower grade of starch obtained from the cassava plant, grown chiefly in Java and Cuba. Several million dollars' worth is imported for this purpose each year. Many native starch-producing plants have been tried, but the dextrin has lacked adhesive qualities or has been too bitter for the palate of the stamp-licking public.

The fact that between 10 and 30 per cent of the sweet potato crop is rejected each year because the potatoes are either too large or too small for ordinary food uses offers a strong economic argument for the development of such an industrial use.

Define Milk Bread, Rye Bread, And Farina Macaroni

THE Food Standards Committee, consisting of representatives of the Association of Official Agricultural Chemists, of the Association of Dairy, Food and Drug Officials, and of the U. S. Department of Agriculture, has revised definitions for milk bread and rye bread, and proposed a new definition for farina macaroni, according to an announcement by W. S. Frisbie, chairman. The committee invites criticisms and suggestions on the proposed definitions. Communications should be addressed to A. S. Mitchell, secretary, Food Standards Committee, Food and Drug Administration, Washington, D. C., and should reach him not later than Sept. 30, 1931.

FARINA MACARONI, FARINA SPAGHETTI, FARINA VERMICELLI are plain alimentary pastes in the preparation of which farina is the only farinaceous ingredient used and are distinguished by their characteristic shapes.

MILK BREAD is the product, in the form of loaves or smaller units, obtained by baking a leavened and kneaded mixture of flour, salt, yeast, and milk or its equivalent (milk solids and water in the proportions normal to milk), with or without edible fat or oil, sugar and/or other fermentable carbohydrate substance. It may also contain diastatic and/or proteolytic ferments, and such minute amounts of unobjectionable salts as serve solely as yeast nutrients.* The flour ingredient may include not more than 3 per cent of other edible farinaceous substance. Milk bread contains, one hour or more after baking, not more than 38 per cent of moisture.

RYE BREAD is the product, in the form of loaves or smaller units, obtained by baking a leavened and kneaded mixture of rye flour, or of rye flour and a wheat flour, with water, salt, and yeast; with or without edible fat or oil, milk or a milk product, sugar and/or other fermentable carbohydrate substance. It may contain diastatic and/or proteolytic ferments, and such minute amounts of unobjectionable salts as serve solely as yeast nutrients.* The total flour ingredient, of which rye flour constitutes not less than one-third, may include not more than 3 per cent of other edible farinaceous substance. Rye bread contains, one hour or more after baking, not more than 38 per cent of moisture.

*The propriety of the use of minute quantities of oxidizing agents as enzyme activators is reserved for future consideration and without prejudice.

Substandard Label Rule To Be More Drastic

The substandard legend required on low-grade canned foods under the Mapes Law will have to appear on both sides of the label if the name of the article appears on one side and a picture on the other, a new regulation proposed by the Food and Drug Administration on July 23 requires. The canning industry has been notified to submit within three weeks any suggestions concerning the contemplated change. Notice will then be given 90 days in advance of the date at which the change in regulations will become effective.

W. G. Campbell, chief of the Administration, states that the change appeared advisable because certain labels in which one panel shows only the brand name and a picture of the article might be displayed in that position, and the substandard label on the opposite panel might not be conspicuous to the purchaser. The standard form of marking (See FOOD INDUSTRIES, April 1931, page 177) must appear on both panels under the new ruling.

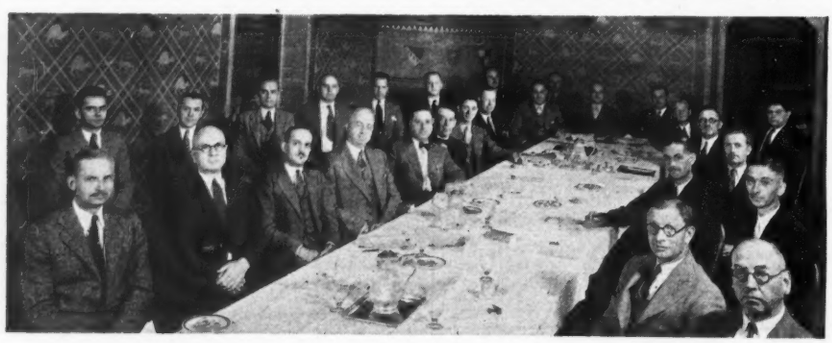
In the announcement of the change, attention also was called to the fact that the marking must appear on shipping cases containing retail packages. The standard marking for containers of 5 lb. or over is suitable for such use.

Chicago Car Pool Group Reports Sales Gain

A gain in sales for the first half of 1931 over the same period last year was reported by every member of the Chicago Big Ten Pool Car Group, composed of food manufacturers in that city who have cooperated in freight shipments by pooling of cars. At the mid-year meeting, held in Chicago on July 8, the savings in freight charges were held largely responsible for this favorable state of affairs. About 1,000 such cars have been shipped since the organization was formed eighteen months ago.

Present membership in the group consists of the following: Allison Bedford Co., canned spaghetti; Budlong Pickle Co., pickles; Chicago Macaroni Co., macaroni; Loyal Packing Co., canned meats; Martin Peanut Products Corp., peanut butter; Oelerich & Berry Co., preserves and jellies; Plochman & Harrison, mustard; Stein Hall Manufacturing Co., cocoanut and tapioca; W. F. Straub Laboratories, honey; M. Wolff & Sons, green olives.

Delegates of car pool group



Pickle Manufacture Aided By Ultra-Violet Rays

AN outstanding feature of the June meeting of the National Pickle Packers' Association was the address of Dr. Otto Rahn on the use of ultra-violet rays in the prevention of fermentation of brine. The meeting was held on June 24 at the Palmer House, Chicago, and was well attended. Dr. Rahn, who is professor of bacteriology at Cornell University, first told the vital part played by lactic acid, together with brine, in the keeping of pickles.

Properly put up, brine pickles, like sauerkraut, produce the necessary acid for their preservation, but the quantity of acid tends to decrease, and this deficiency must be supplied. The most important factor in bringing about this decrease is the formation of a yeast, or scum, on the surface. It is a real yeast, although different from common bakers' yeast, he continued. It oxidizes the lactic acid, and when the acidity drops below the point necessary for preservation of the pickle, trouble begins.

The method of dealing with the trouble is based on the fact that ultra-violet rays will kill micro-organisms. Laboratory experiments, therefore, were directed to turning ultra-violet rays on a jar of pickles in brine, reproducing, as far as possible, the conditions of the ordinary packing plant. After many trials as to time and frequency of treatments, it appeared that exposure to the rays for 20 min. every day, or for 30 min. every other day, would prevent yeast formation.

The process is rather expensive for use in a small plant, said Dr. Rahn, but not for a large plant. A lamp of the proper size costs about $150, and it will use 1 kw. in two hours, or perhaps $70 per year for current. In addition, there will be the cost of a new bulb each year, or $90, a total of at least $150 per year, after the first year. One lamp can take care of sixteen tanks, so for a much smaller number its use would be rather costly. It was found that if the use of the light rays was omitted for three days in succession, the yeast would form to such an extent that its growth could not be checked by further use of the rays.

The meeting was called to order by President Lees Ballinger, and the morning session was taken up with the president's address and reports of committees. The association's advertising agents, Young & Rubicam, were represented at the meeting, and considerable time was devoted to matters of promotion. Entertainment was furnished at the luncheon by members of the Chicago Opera company. A resolution was offered at the afternoon session to memorialize Congress asking for exemption from the provisions of the Sherman Anti-trust Act which prohibit discussion as to limitation of production. After some discussion it was decided to refer the matter to legal counsel, and to defer action.

$5,000 Fine Is Imposed For Corn Sugar Sale

PROHIBITION Bureau officials were encouraged by the news early last month that the Corn Products Refining Co. had paid a fine of $5,000 in the federal district court at Springfield, Ill., on a plea of *nolo contendere* to charges of conspiracy to violate the prohibition law in the sale of corn sugar to bootleg distillers. Enforcement officials were frank to admit, however, that they had observed no diminution in the use of corn sugar for illicit beverage purposes since the company was indicted eighteen months ago along with the Fleischmann Yeast Co., J. C. Hubinger Bros. Co., and others alleged to be supplying the bootleg trade with its raw materials. The Fleischmann company is contesting the charges made by the government. The Hubinger company was found guilty several months ago.

In a survey of corn sugar production covering the fiscal year ended June 30, 1930, the Bureau estimated that of a total estimated production of 894,986,000 lb. of corn sugar in 1929, only approximately 40 per cent can be accounted for in legitimate manufacture. About 75,000,000 lb. was seized during the fiscal year ended June 30, 1930.

Crab-Meat Plants Face Sanitation Drive

STRICT adherence to sanitary requirements established for the growing crab-meat industry of Louisiana will be demanded of all plants, according to John H. O'Neil, of the State Board of Health, who is urging buyers to reject any container of fresh boiled crab-meat which does not bear the certificate number of the Board.

Present methods used by the packers call for the boiling of the crab, picking of the meat by hand, packaging it in either glass or metal containers, and refrigeration at low temperature until consumed. The metal containers are either lacquered or paper lined. Because the crabs must be alive when the boiling process begins, there is a strong desire on the part of small operators to place their plants in sea marshes or on bayou banks adjacent to fishing grounds, in order to reduce the transportation losses. This desire is strongly opposed by the Board of Health because of the dearth of adequate water supplies at such points and the actual non-existence of sanitary facilities.

The Board has taken the stand that any plant to be used in the packing of fresh boiled crab meat must meet the following minimum standard requirements: It must be screened and clean: it must have an adequate supply of water, free from contamination, for cooking crabs, cleaning, lavatory, and potable use; it must provide medical inspection of workers; it must have sanitary lavatory and toilet facilities with adequate supplies of hot water, soap, and towels; and it must have proper refrigeration.

Plaster Models of Hogs Show Government Grades

Government standards for grades of livestock can be demonstrated more effectively by sets of plaster models now being designed than they can by drawings, photographs, or even live animals, the Department of Agriculture has found. Models illustrating standards for three types and six grades of slaughter hogs led to such favorable comment when put on display that preparation of models for cattle, calves, sheep, and lamb is now being considered. A cheap means of duplicating the models is being sought.

The models have proved more satisfactory than live animals or photographs, because they represent ideals rather than individual examples, which are always deficient in one respect or another.

No Agreement Reached on Canned Food Guaranty

THE joint meeting of the conference committee of the National Canners' Association with representatives of distributors' organizations held in Milwaukee, Wis., on July 7 adjourned without reaching a decision on an equitable form of food guaranty. As reported last month (FOOD INDUSTRIES, Vol. 3, page 318), the organizations representing the wholesalers have proposed a guaranty form to relieve them of all responsibility for failure of canned goods to measure up to the Mapes Law standards, as well as the older provisions of the Food and Drug Law.

The committee representing canners was appointed at the recent board of directors' meeting of the association to work out a form which would not place upon canners responsibility for changes beyond their control. Although representatives of the National Wholesale Grocers' Association were willing to make slight modifications in the original form, these were not regarded as acceptable by the committee representing canners. The chairmen of the conference committees of the different organizations, however, were authorized to appoint a committee of five each to meet prior to the January convention of the National Canners' Association to consider the matter further.

Meanwhile, the guaranty form recommended by the canners' committee has been proposed for use of those canners who do not consider the grocers' form acceptable. The form is as follows:

CONTINUING PURE FOOD GUARANTY

Approved by those members of Conference Committee representing the National Canners' Association

The undersigned seller guarantees that all articles of food sold by seller to..... purchaser shall not be adulterated or misbranded within the meaning of the pure food laws of the state to which shipment is made and within the meaning of the Federal Food and Drugs Act of June 30, 1906, and amendments thereto; provided, however, that the seller does not guarantee against such goods becoming adulterated or misbranded within the meaning of said laws or of said act, as amended, after sale and delivery by reason of causes beyond seller's control; and provided that special guaranty against swells and spoils with time limit for claims or allowance in lieu of guaranty for swells and spoils, shall govern if included in sales contract.

Following the report of the disagreement, the Tri-State Packers' Association, through F. M. Shook, field secretary, recommended that canners continue to use the form approved at the joint meeting of the Pennsylvania Canners' Association, the Baltimore Canned Foods Exchange, and the Tri-State Packers' Association. This form is largely similar to that given above, but contains the following paragraph:

The goods covered by this contract are subject to deterioration in quality through handling, transportation, improper conditions of storage, and other causes, and in event of a claim that the goods shipped hereunder were misbranded as to quality, the burden of proof will be upon the claimant to show that the condition complained of did not arise out of conditions beyond the seller's control but existed at the time of the shipment by seller.

Freight Rate Rise Opposed By Food Groups

By Paul Wooton
Washington Correspondent

RAILROADS advised the Interstate Commerce Commission on July 21, during the hearing on their plea for a blanket increase of 15 per cent in freight rates, that refrigeration charges will be increased to the same extent if their petition is granted. The railroads stood firm on their announced intention to apply the percentage increase to all freight traffic, but admitted under cross-examination by shippers that reductions would follow on traffic that obviously could not pay its way.

Agricultural interests of the West are preparing elaborate evidence in opposition to the rate boost for presentation when the hearings are resumed. Senator Johnson, of California, asserts that an increase would be ruinous to the fruit and produce growers of the West. He estimates that the 15 per cent advance would add $22,000,000 annually to the freight burdens of California fruits and vegetables alone.

If authorized by the Commission, the blanket increase would apply to the revised rate scales on livestock which are to become effective Oct. 27, 1931. The new livestock rates call for an increase of approximately 10 per cent in Western territory, to be accompanied by reductions of 6 per cent in Southwest and 1.75 per cent in Mountain-Pacific territories.

Complete revision of freight rates on fresh meats and packing-house products in and to Southern territory is recommended for adoption by the Interstate Commerce Commission in a proposed report by Examiners Stiles and Parker on proposals submitted by the railroads. The new basis of rates would not materially affect the level of rates on carload traffic in either fresh meats or packing-house products nor on less-than-carload shipments of fresh meats, but rates on less-than-carload shipments of packing-house products would be advanced considerably.

The examiners reported that railroads had not justified their request for Sixth Class rating (40 per cent of First Class) on packing-house products in carloads. They held that 35 per cent of First Class should apply, either on the basis of Seventh Class (Class B) or as a carload commodity rate.

The examiners recommended the railroads' proposal for an increase which averages 57 per cent on less-than-carload shipments of packing-house products. In the future this traffic would rate Fourth Class, or 55 per cent of First Class, instead of 35 per cent.

No change is proposed in the present Fourth Class rating on fresh meats, in carloads, which is 55 per cent of First Class, nor in the Second Class rating on l.c.l. shipments, but a commodity rate of 47.5 per cent would be available for all carload shipments, and this rate has the approval of the examiners.

A reduction in less-than-carload freight ratings on food products packed in glass to the basis applicable when packed in tin, advocated by the Glass Containers' Association, is opposed in a report submitted to the Interstate Commerce Commission by two of its examiners. Their report asserts that it is just such yielding to the demands of well-organized groups of shippers that has brought the railroads to the Commission pleading that ruin will be their lot unless the percentage increase in all rates is quickly administered.

Second-class ratings have applied to glass-packed foods and third-class ratings to tin-packed foods since 1924. Tariffs placing the two packages on a complete parity were filed by the Eastern roads last February, but their operation was suspended by the Commission, pending investigation.

The Commission held in 1924 that the differential in rates was warranted by difference in price and quality, coupled with the fragility of glass as compared to tin. The examiners said there can be little question but that the glass container is chiefly used for the higher-priced brands. The Glass Containers' Association advertises that "only the choicest foods can be packed in glass" and the Commission's examiners remarked that there appears to be more than a modicum of truth in this phrase. Those desiring the reduction now contend that the methods of manufacturing glass containers and the methods of packing the filled containers for shipment have so improved that the glass container is no longer less desirable from a transportation standpoint. The American Sheet & Tinplate Co. and the American Can Co. questioned whether glass containers now shipped by freight are appreciably stronger than those used six years ago. They assert that if there has been some technical improvement in manufacturing process, the benefit which would otherwise inure to the railroads has been offset by the practice, recently adopted by some food packers, of shipping their products in thin glasses suitable for table use.

The examiners also declared that there is no reasonable foundation for the carriers' hope of deriving added tonnage from the greater use of glass containers under the reduced rates, by reason of the increased ratio of tare to net weight carried.

Progress Report Issued on Canned Food Survey

THE first report of canned food stocks, to be compiled quarterly by the Foodstuffs Division of the Commerce Department, was issued July 25. Based on July 1 stocks, it is solely a progress report indicating the extent to which the effort to obtain figures has been successful. No definite proportion of total stocks is shown.

When the second report is issued, on Oct. 1, it is expected that comparison with the present report will show trend of movement into distribution. The report is summarized in the tables below:

Extent of Coverage of Canners' Stocks

Product	No. of firms reporting	Stocks held by the reporting firms (cases)
Peas (old pack stocks only)	117	2,026,872
Corn	197	1,792,259
Tomatoes	405	2,504,120
Green and Wax Beans	259	1,541,284
Peaches	61	2,993,760
Pears	70	698,310
Pineapple	9	2,068,857
Salmon	33	541,732

Extent of Coverage of Distributors' Stocks*

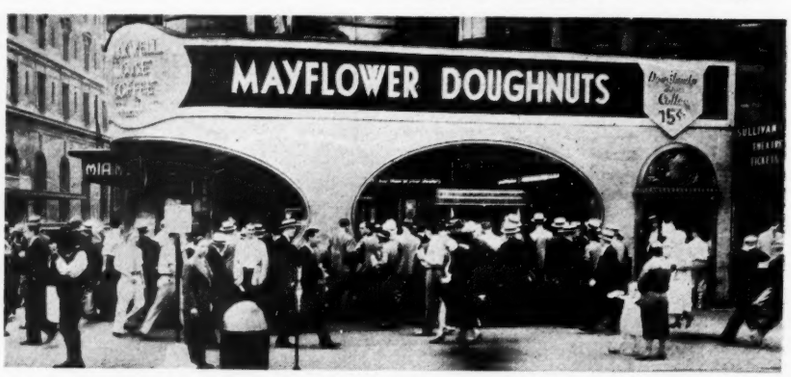
Products	Stocks held by the reporting firms (cases)
Peas	1,125,246
Corn	1,042,441
Tomatoes	1,374,355
Green and Wax Beans	580,775
Peaches	503,917
Pears	198,033
Pineapple	497,564
Salmon	399,863

**Stocks reported by 61¼ distributors.*

"Great White Way" Gets Doughnut Plant

A COMPLETE doughnut manufacturing unit with a capacity of 1,800 doughnuts an hour is now operating at one of the busiest corners in the world, Broadway and 45th St., New York City, replacing the model cigarette factory which for five years was a prominent tourist feature. The plant is in operation 24 hours a day in full public view.

The Ward Baking Co., holder of the "Mayflower" doughnut franchise in New York, is cooperating with the Doughnut Machine Corp. in the venture, and General Foods Co. has taken part of the space to promote Maxwell House coffee. Doughnuts and coffee are served in one part of the store. Doughnuts are sold in a special souvenir carton, and mail orders are taken for shipment throughout the country.



Changes Made in Foreign Duties and Restrictions

INCREASES in the French import duties on canned fish, certain dried and preserved fruit, and preserved asparagus are established in a law approved by the French legislature on July 7. The increased rates are to apply retroactively to shipments made after June 30, 1931.

The increases in duties applying to imports from the United States, according to the Department of Commerce are as follows (rates in francs per 100 kg.):

Canned fish (including sardines), from 85 to 300; dried peaches and apricots, from 60 to 75; dried apples and pears, from 30 to 60; fruit (except pineapple) preserved with sugar, from 135 to 235, and without sugar, from 50 to 90; and preserved asparagus, from 52.50 to 100.

The maximum proportion of imported wheat permitted to be used in milling of flour in France has been decreased from 25 to 20 per cent, according to a decree promulgated on July 4.

A decree of July 11, 1931, has abolished the requirement placed in effect Jan. 17, 1931, that the sanitary certificates accompanying imports of pork products into France must also indicate that such products were found to be free from trichina after being subjected to a trichinoscopic examination.

The Italian import duty on wheat flour and corn meal was increased from 87 to 92.90 paper lire per 100 kg., gross, effective July 8, according to a radiogram to the Commerce Department from the Commercial Attache at Rome. Import duties on frozen meats, rye, and rye flour were also increased in Italy effective July 10. The new duties, in paper lire per 100 kilos, gross, are as follows (old rates in parentheses):

Frozen meats, general rate, 100 (free); rate applying to most favored nations, including United States, 25 (free); rye, 36.50 (16.50), and rye flour, 50.90 (23.90) from all sources.

The fixed valuations for Canadian import duty purposes of 15c. per lb. on asparagus, and 4c. per lb. on rhubarb, established April 25, 1931, have been canceled, effective July 14, the Department of Commerce reports. The import duty of 30 per cent *ad valorem* on these two products (but not less than 3c. per lb. from April 15 to May 31, inclusive, on asparagus, and not less than 1c. per lb. from March 1 to May 31, inclusive, on rhubarb) will be based on the fair market value of each product.

Release Distribution Data On Flour and Vinegar

FIGURES showing the relative importance of the various channels through which flour and other grain-mill products are marketed, as revealed in the 1929 distribution census figures, have just been released by the Department of Commerce. Distribution data on the vinegar and cider industry, excluding that made on farms and as by-products, also have recently been made public. The information is given in tabular form below:

Distribution of Sales, 1929, in the Flour and Other Grain-Mill Products Industry

	Selling Value (F.O.B.) factory)	Percentage of Sales	—Number of Plants— Total	Selling Exclusively as Indicated
Total sales‡	$1,111,036,000	....	4,022	...
Sales not distributed by manufacturers reporting	107,365,000	....	1,527	...
Sales distributed by manufacturers reporting	1,003,671,000	100	2,495*	...
Sales to manufacturers' own wholesale branches†	77,266,000	7.7	231	34
Sales to manufacturers' own retail branches†	14,158,000	1.4	195	29
Sales to dealers:				
Wholesale	404,697,000	40.3	988	139
Retail	271,874,000	27.1	1,479	270
Sales to users (bakeries, manufacturers of food products, farmers, etc.)	235,676,000	23.5	1,728	533

Of the above sales to dealers and users, $179,167,000 was made through manufacturers' agents, selling agents, brokers, or commission houses by 374 manufacturing plants, 69 plants selling their entire putput in this way.

‡The total sales as shown above are $50,708,000 greater than the value of products reported by the census of manufactures. This difference represents the amount of jobbing reported by the manufacturing plants in the industry.

*The total number of manufacturing plants engaged primarily in the manufacture of flour and other grain-mill products, is 4,022. Of these 1,527 were unable to classify their sales. Inasmuch as some of the remaining 2,495 plants sell to more than one type of customer, this figure is less than the total of the figures shown below it.

†This report does not show the sales by manufacturers' own sales branches to dealers and to users.

Distribution of Sales, 1929, in the Vinegar and Cider Industry

	Selling Value (F.O.B.) factory)	Percentage of Sales	—Number of Plants— Total	Selling Exclusively as Indicated
Total	$11,014,000*	100	172†	...
Sales to manufacturers' own wholesale branches‡	313,000	2.8	11	2
Sales to manufacturers' own retail branches‡	123,000	1.1	4	1
Sales to dealers:				
Wholesale	7,879,000	71.5	133	67
Retail	1,417,000	12.9	55	9
Sales to users:				
Industrial (manufacturers of relishes, pickles, salad dressings, etc.) including interplant transfers	1,163,000	10.6	32	3
Household	119,000	1.1	29	4

Of the above sales $3,121,000 was sold through manufacturers' agents, selling agents, brokers or commission houses by 44 manufacturing plants. Twelve plants sold their entire output in this way.

*The report does not include the sale of cider and vinegar made on farms, nor the sale of approximately $8,000,000 worth of these commodities made as secondary products in other industries, principally the canning and preserving industry.

†The total number of manufacturing plants engaged primarily in the manufacture of vinegar and cider is 172. Inasmuch as some plants sell to more than one type of customer, this figure is less than the total of the figures shown below it.

‡This report does not show the sales by manufacturers' own sales branches to dealers, and to users.

Seasonal Influences Aid Food Groups

Continued recession in wholesale and retail food prices took place in the month ending June 15. The drop, however, was less severe than that which occurred during the April-May period. The lowering in wholesale food prices was 0.68 per cent, compared to a drop of 3.57 per cent in the preceding month. Retail food prices in 51 cities declined 2.0 per cent from May 15 to June 15, compared to a former drop of 2.5 per cent. Wholesale food prices on June 15 averaged just 20 per cent below the previous year's figure. Wholesale prices on all commodities in the May-June period showed a decline more than twice as great as that for food.

Employment and payroll totals in the food manufacturing industries as a group remained practically the same during the month of June, according to the Bureau of Labor Statistics, a 0.1 per cent rise in the employment index and a 0.1 per cent drop in the payroll index from the May figures being reported. Figures for all manufacturing industry showed a drop of 2.6 per cent in the employment index and 6.2 in payroll totals. One of the three industrial groups showing a gain in employment was the canning and preserving industry, seasonal activity leading to an increase of 26.1 per cent. Ice cream and beverages also reacted to seasonal stimulus.

Based on the index figure of the *Business Week*, general business conditions now are on approximately the same level as 30 days ago. The index now stands at 76.0, compared to the low figure of 75.8 a month ago.

Crop and Livestock Estimates Show Varying Trends

THE world supply of wheat in all countries except China for the 1931-32 season now seems likely to be about 250,000,000 bu. less, or nearly 5 per cent, than for the preceding season, according to the Bureau of Agricultural Economics in its June 30 report.

Present prospects, says the Bureau, indicate a world carryover somewhat larger than last year's and a world crop considerably smaller. Preliminary reports as to production, acreage, and crop conditions indicate a production in the Northern Hemisphere, excluding Russia and China, of about 3,075,000,000 bu., or about 225,000,000 bu. less than last year's crop.

In North America, due to the very poor condition of spring wheat in the United States and Canada, a reduction

as compared with last year of about 200,000,000 bu. in the total wheat crop is indicated, despite a very large production of winter wheat in the United States.

A year of large fruit production is forecast from July 1 prospects in a report of the Bureau released July 16. The composite yield per bearing acre is judged to be 14 per cent above average, or about 10 per cent heavier than last year. If present conditions hold good, the largest peach crop on record, 141 per cent of the 1925-29 average, totaling 77,963,000 bu., is expected. The grape crop is below both last year's prospects and that for the previous five-year average. A hot spell the first week in July lowered the prospects for California's crop by 12.5 per cent. A crop 30 per cent smaller than last year is forecast in that state.

In a release concerning potato prospects on July 1, issued July 18, the Bureau estimated this year's crop at 396,450,000 bu., 15 per cent larger than the 1930 crop. A large part of this gain results from increased acreage, particularly in the central states. An acreage increase of 10.7 per cent is estimated.

Sweet potatoes, acreage of which has been increased about 20.6 per cent over last year, are below average in condition. Production is forecast at 74,070,000 bu.

Hog marketings smaller than last year are anticipated in the United States for the remainder of the marketing year, according to the prospect report of the Bureau of Agricultural Economics released July 14. Returns from the June pig survey of the Department of Agriculture, however, indicate an increase in breeding operations. Continued heavy market supplies of hogs in Europe through the autumn and winter are expected, but signs of reduced breeding are in evidence, particularly in the Netherlands and Germany.

The storage situation in the United States continues to be a depressing factor on the hog market. Stocks of pork on June 1, amounting to 828,000,000 lb., were 5 per cent smaller than those of May 1, but were 23 per cent larger than those of June 1, 1930, and 10 per cent above the 5-year June 1 average. Lard stocks on June 1 amounted to 103,000,000 lb., which were 10 per cent smaller than on June 1 last year. Preliminary indications point to some improvement in the storage situation on July 1, due primarily to the marked reduction in June hog slaughter.

Less poultry on farms, reduced storage stocks of poultry and eggs, sustained consumption of poultry products, and cheaper feeds in relation to prices of poultry and eggs are the outstanding factors in the midsummer poultry outlook report issued by the Bureau on July 23.

Domestic dairy production is showing much more than the normal seasonal decline and butter prices are tending slightly higher. Danish butter production has passed its peak, but continues heavy. Australia is finishing a year of record exportation of butter, the quantity exceeding any previous year on record. The foreign trade of the United States in dairy products continues stable although the total volume is the lightest in recent years.

TRADE NOTES

M. Carpenter Baking Co., Milwaukee, Wis., has developed a process by which whole wheat, rye, and white bread are baked in one loaf.

Dairymen's Cooperative Sales Association of Pittsburgh, with 15,000 members; the Northwestern Ohio Cooperative Dairy Association, Bowling Green, Ohio, with 5,000 members; the North Central Ohio Dairy Association, Bucyrus, Ohio, with 3,000 members; and the Seneca County Dairy Co., with 200 members are nearing completion of plans for a merger which will form the second largest cooperative dairy organization in the United States. The Cleveland Cooperative Dairy Association may also be included in the merger.

Dubuque Packing Co. has been purchased by Harry W. Wahlert, St. Louis, Mo., who has announced that $100,000 will be spent in improving and modernizing the plant. Mr. Wahlert will be president and B. M. Paar, vice-president and secretary of the organization.

Fort Plain Milk Co., said to have been largest independent dairy concern in New York State, has merged with the Dairymen's League Cooperative Association. The new name of the company will be either the Fort Plain Farmers' Association or the Fort Plain Producers' Association.

General Vanilla Corp., Rochester, N. Y., has been chartered at Albany with capital of 700 shares of preferred stock of $100 par value and 300 shares of common stock of no par value, to manufacture flavoring extracts.

Kraft Phenix Cheese Corp. has developed a super-thick malted milk containing banana powder, a new product that received much attention at the Milwaukee Food Show. It is being launched by an extensive promotional program in Eastern cities. Kraft Phenix Cream Cheese Corp., a subsidiary, has begun the manufacture of Philadelphia Cream Cheese. It will be shipped in bulk to Atlanta, Ga., put in packages there, and distributed throughout the Southeastern division.

Maltine Co., New York City, and Curtice Brothers, Rochester, N. Y., have joined forces in the formation of a new company, Certifoods, Inc., to manufacture and distribute a line of sieved vegetable products for children and invalids. The formation of the new company does not affect the other products of the two individual companies.

National Dairy Council and Ohio dairymen have made plans to stimulate the sale of butter by an extensive advertising campaign. The campaign is to be paid for from a fund now being raised by the Council through the collection of 1c. from each check the dairymen receive for their cream.

National Dairy Products Co., New York City, has withdrawn its provisional offer for the acquisition of assets of the Golden State Co., Ltd. This action is thought to have been taken as a result of opposition that has developed among Golden State stockholders that would have led to extensive litigation.

B. S. Pearsall Co., Elgin, Ill., has announced entry into a new line of food manufacture, that of canned soups, pasteurized tomato juice, and tomato juice cocktails.

Pie Bakeries of America, Inc., New York City, has formed a committee representing substantial holdings of the various classes of stock, consisting of F. W. Birkenhauer, H. H. Bellows, H. F. Boerth, and Francis L. Bittles, for the purpose of effecting a plan of recapitalization of the organization. The plan has the approval of the officers and directors, but will not be declared without the consent of holders of at least 90 per cent of the outstanding Class A stock.

Pillsbury Flour Mills Co. has begun another 36 station broadcast over the Columbia System, known as the Pillsbury Pageant.

PERSONALS

Dr. Henry Arnstein, who is acting in an advisory capacity on food and chemical processes for several Latin-American governments, is on a Central American tour and will return late next fall.

Theron H. Butterworth, who recently received a Ph.D. degree in agricultural bacteriology from the University of Wisconsin, has joined the scientific staff of the Walker-Gordon Laboratory Co., Inc., Plainsboro, N. J. He will supervise production of and research in acidophilus and other fermented milks.

Albert E. Carlton, president of the Holly Sugar Corp., Colorado Springs, Colo.; Lucius R. Eastman, president of Hills Brothers Co., New York City, and Howard Heinz, H. F. Heinz Co., Pittsburgh, Pa., have been appointed to the American committee of the International Chamber of Commerce which will serve during the next two years in directing American participation in the affairs of the International Chamber.

J. M. Cox has been appointed to succeed C. Egler as manager of the National Biscuit Co.'s Cleveland agency.

Mr. Cox has been connected with the company since 1910 and goes from the general offices in New York City, where he has been a district sales manager since May, 1928.

HARRY C. DARGER, general manager of the Blue Valley Creamery Co. since 1923 and a member of this organization since 1916, has resigned his position. RICHARD H. VANSANT, former assistant general manager, who has been with the company since 1910, will succeed him. ROBERT F. WALKER will assume the position of assistant general manager.

GEORGE A. DAUT, former secretary of the Ohio State Bakers' Association, has entered the flour brokerage business and incorporated a company to be known as George A. Daut, Inc.

ALVIN E. DODD has been elected a director and vice-president of the Kroger Grocery & Baking Co. Dr. Dodd, formerly assistant to the president, will be in charge of the merchandising department. Prior to joining the Kroger organization he was assistant to the president of Sears, Roebuck & Co.

D. D. FREDERICK, assisted by J. C. MILTON, is now in charge of product sales for Armour & Co. throughout the country, directly under Vice-President I. M. Hoagland.

AVERY S. HOYT has been appointed assistant chief of the Plant Quarantine and Control Administration, U. S. Department of Agriculture. Mr. Hoyt has had long experience in plant quarantine work.

JAMES T. JARDINE, director of the Oregon Agricultural Experiment Station, Cornvallis, Ore., has been selected by Secretary of Agriculture Hyde to head the office of experiment stations in the Department of Agriculture. Mr. Jardine, who will take office Sept. 1, will also serve as assistant director of scientific work for the department.

FRANK J. LOEFFER has been named sales manager of the gelatine department, and THOMAS HARRIGAN manager of the cured ham department of Wilson & Co., Ltd. J. I. RUSSELL, manager at Boston, has been transferred to New York and is succeeded by GEORGE L. HORTON.

FRANK C. LOWRY, of Lowry & Co., sugar brokers, has been elected president of the National Biscuit Co. to succeed FREDERICK BEERS who was made chairman of the manufacturing committee. Mr. Lowry has been connected with the sugar trade more than thirty years.

E. J. MEHREN, vice-president of the McGraw-Hill Publishing Co., in charge of the Chicago offices, has resigned to become president of the Portland Cement Association.

H. H. VON LOESECKE, who will have charge of the new citrus fruit by-products laboratory of the Bureau of Chemistry and Soils at Winter Haven, Fla., has gone to Florida to begin his new duties. The initial work under Mr. von Loesecke includes a study of methods of preserving orange and grapefruit juice, of developing orange and grapefruit byproducts, and of utilizing orange and grapefruit wastes.

CECIL WADLEIGH, a graduate of the Massachusetts Agricultural College, has succeeded Robert Young as holder of the National Kraut Packers' Association fellowship in Ohio State University. He will continue the study of factors which influence the yield and quality of cabbage grown for kraut.

ROBERT X. WALKER has been made general sales manager of the Jewel Tea Co., succeeding JOHN REGAN. C W. KAYLOR was named manager in charge of operations, and ROBERT M. MUIR, personnel director; J. S. SLIPPER succeeds D. E. MARRIETTA as manager of the Kansas City district; L. A. CASHMER has been appointed new Northwestern manager at Minneapolis.

OBITUARY

ROYAL F. CLARK, past president of the National Canners' Association, died at Rochester, Minn., on July 20. Mr. Clark became connected with the canning industry in 1911, and in 1922 he

helped to organize the Central Wisconsin Canneries, of which he was president at the time of his death. In 1919 Mr. Clark was elected a director of the National Canners' Association and in 1924 became its president. When he died, Mr. Clark was chairman of the general advertising committee of the association and chairman of the conference committee. He also was a member of the administrative council, the advisory board, and the finance and adjustment committees.

STEPHEN MOULTON BABCOCK, inventor of the test for butter fat in dairy products that bears his name, died at his home in Madison, Wis., on July 1. He was 87 years of age and for 44 years had been professor of agricultural chemistry at the University of Wisconsin. He was also chief chemist of the Wisconsin Agricultural Experiment Station. The butter-fat test was developed in 1890, and Dr. Babcock's generosity and scientific idealism in failing to commercialize it added to his international renown. He also invented a curing process used in cheese manufacture.

CLARENCE A. CRANE, president of the Crane Chocolate Co., manufacturer; the Crane Co., which handles the retail business; and the Cartier Chocolate Co., a subsidiary, died recently at his home in Chagrin Falls, Ohio. He was 55 years of age.

F. E. FOOS, president of the Foos Candy Manufacturing Co., Baltimore, Md., a prominent figure in the candy industry for more than half a century, died on July 10 at his home in Catonsville, Md.

ABEL M. HAMBLET, director of research of the Johns-Mansville Corp., died on June 7. Mr. Hamblet was said to have been the first chemist in the United States successfully to make U. S. P. lactic acid.

JOHN J. HIGGINS, eastern district manager for John F. Jelke Co., died on June 30 at his home in Berwyn, Ill., aged 35 years. He had been ill for about six months.

ERVIN P. HINDS, traffic manager for Armour & Co. until his retirement a few months ago, died July 1 at his home at Crystal Lake, Ill.

MEYER E. JAFFA, professor emeritus of nutrition at the University of California and director of the Bureau of Food and Drugs of the California Department of Health, died at his home in Berkeley, Calif., June 27, at the age of 73. Born in Sydney, Australia, Prof. Jaffa came to this country at the age of nine years. He was graduated from the University of California in 1877. A pioneer in pure food legislation, he drafted the act creating the California Bureau of Food and Drugs, and was its first director from 1907 to 1914, a position which he reassumed six years ago, when he retired from active university work.

EDWARD J. PERRY, head of the claims department, Armour & Co., was recently killed in an automobile accident.

A. L. STONE, 53, formerly vice-president and general manager of the Dairy Delivery Co., died at his home in San Francisco on June 24. Mr. Stone was recognized as one of the leading dairy experts of the Pacific Coast.

HENRY D. WALTERS, 75 years old, prominent in the grain and grain elevator business, died on June 28 in Buffalo, N. Y. He was president of the Corn Exchange for six years, and for eight years president of the Western Elevating Association.

NEW CONSTRUCTION

Bakery—Continental Baking Co. Inc., 14th St., Hoboken, N. J., awarded contract for alterations to bakery at 14th St. and Park Ave. to White Construction Co., 95 Madison Ave., New York, N. Y. Estimated cost $40,000.

Bakery — Gutzwiller Bros., 1242 Madison Ave., Indianapolis, Ind., awarded contract for a 40 x 140 ft. bakery to C. Prader, 530 Sanders St., Indianapolis. Estimated cost $40,000.

Bakery—C. J. Patterson Corp., 4050 Penn St., Kansas City, Mo., will build a 1 story, 70 x 110 ft. bakery plant at Amarillo, Tex. Estimated cost $60,000. Private plans. Work will be done by owner's forces. Some equipment will be required.

Bakery — Puritan Baking Co., 286 Terrill Road, Plainfield, N. J., will not construct 1 story bakery plant. $40,000. Project abandoned. Building permit denied.

Bakery—O. G. Reising, 2339 West Franklin St., Evansville, Ind., awarded contract for a bakery to Floyd Trash, 813 Covert Ave., Evansville. Estimated cost $40,000.

Beverage Plant—Ne Hi Bottling Works, 400 East "B" St., St. Louis, Mo., manufacturers of diversified beverages, acquired lease with option to buy 1 story building at 4718-4728 West Harrison St., Chicago, Ill., will construct top addition, 121 ft. to house research and testing laboratories, etc. Estimated total cost $250,000. Edward Steinborn, 123 West Madison St., Chicago, is architect. Plant will be equipped with latest types of bottling machinery. Unit will be known as Chicago-Ne Hi Corp.

Bottling Plant—Norton Drinx Co., C. H. Norton, King St. E., Kitchener, Ont., is having plans prepared for the construction of a 2 story, 50 x 100 ft. bottling plant. Interested in prices on complete equipment.

Candy Factory—Dilling Candy Co., West Morris St., Indianapolis, Ind., will build an addition to factory at Morris and Chocolate Sts. Estimated cost $40,000. Private plans. Work will be done by owner's forces.

Canning Plant—Connecticut State Farm for Women, c/o Comptroller, State House, Hartford, Conn., awarded contract for a canning plant, storage building, etc. at Niantic to Nunzio Corsino, 52 Eaton St., Hartford, $49,753.

Dairy Plant—Gold Medal Dairy Co., Division and Garvin Sts., Evansville, Ind., awarded contract for the construction of a dairy plant to Luhring Lumber Co., 1 North Morton Ave., Evansville. Estimated cost $40,000.

Dairy Building—J. E. Harshbarger, 406 24th St., Altoona, Pa., is receiving bids for the construction of a 2 story, 75 x 100 ft. dairy building. Estimated cost $50,000. McCormick Co., 121-27 South Negley Ave., Pittsburgh, is architect.

Dairy Plant — Indiana Soldiers & Sailors Orphans Home, Knightstown, Ind., awarded contract for a dairy plant to E. W. Moir, 4 North Dearborn St., Indianapolis. Estimated cost $25,000.

Dairy Plant — Puritan Dairy Products Co., 683 New Brunswick Ave., Perth Amboy, N. J., is having revised plans prepared for a 1 and 2 story, 100 x 400 ft. dairy plant. Estimated cost $400,000. Ballinger Co., 100 East 42nd St., New York, N. Y., is architect. Maturity early winter.

Milk Depot — Sidney Wanzer & Sons, 124 West Garfield Ave., Chicago, Ill., are having plans prepared for a 1 and 2 story, 200 x 418 ft. milk depot, including refrigeration department, office, garage, etc., at Argyle and Lincoln Sts. Estimated cost $125,000. Richard Griesser, 64 West Randolph St., Chicago, is architect.

Milk Plant—Dairyland Products Inc., subsidiary of Safeway-McMarr Stores, 5725 East 14th St., Oakland, Calif., plans the construction of a condensed milk plant, 48,000 cans daily capacity, at Tracy. Architect not selected.

Cold Storage Plant—Commonwealth of Massachusetts, W. A. Merrill, State House, Boston, Mass., is receiving bids for a heating and cold storage plant to include boilers, piping and stokers at Monson. Estimated cost $300,000. Edward C. Brown Co., 77 Summer St., Boston, is engineer.

Cold Storage Plant — Lake View Farm, H. Rogers, Southington, Conn., awarded contract for the construction of a 1 story fruit cold storage plant to Hayes Construction Co., 1285 East St., New Britain, Conn. Estimated cost $40,000.

Cooling System — Neiman-Marcus Co., Main and Ervay Sts., Dallas, Tex., awarded contract for the construction of complete air conditioning and cooling system to Smith & Whitney, Cedar Springs Ave., Dallas. Estimated cost $30,000.

Ice House—W. A. Jones, Barnstable, Mass., plans the construction of a 1 and 2 story ice house at Dennis Pond, Yarmouth. Estimated cost $25,000 to $30,000. Private plans.

Ice Plant—Collierville Delivery Co., W. H. Mann, Collierville, Tenn., plans to rebuild ice plant destroyed by fire.

Ice Plant—C. W. Parson, Milam Bldg., San Antonio, Tex., is having plans prepared for the construction of a 1 story, 90 x 110 ft. plant for the manufacture of dry ice at Harlingen. Estimated cost $60,000. Private plans.

Ice Making and Refrigeration Plant—City of San Jose, Calif., awarded contract for the construction of an ice making and refrigeration plant in service building at County Hospital, to Carbondale Machinery Co., 1031 South Broadway, Los Angeles, $11,630.

Pre-Cooling Plant—N. D. and S. Naman, 3232 East Tulare St., and H. Krum, 311 Broadway, Fresno, Calif., plans the construction of a 2 story pre-cooling plant on G St.

Refrigeration Plant — Public Works Officer, 11th Naval District, San Diego, Calif., will receive bids until August 18 for the construction of a refrigeration plant at Naval Operating Base Air Station. Spec. 6562.

Refrigerator Building—Swift & Co., Union Stock Yards, Chicago, Ill., awarded contract for a 2 story, 65 x 102 ft. refrigerator building at Sioux City, Ia., to W. A. Klinger, Inc., 201 Warnock Bldg., Sioux City. Estimated cost $85,000. Cooling system will be installed.

Refrigerated and Distribution Warehouses—Municipalities of Bologna, Milan, Palermo and Naples, Italy, plan the construction of refrigerated and distribution warehouses for meats, dairy products, etc., also for fruits and vegetables. Each to exceed $1,000,000.

Alfalfa Meal Plant—Arizona Seed & Feed Association, M. Humphrey, Gen. Mgr., Phoenix, Ariz., plans the construction of an alfalfa meal plant at Buckeye. Estimated cost $25,000.

Grain Elevator—Great Northern Ry. Co., St. Paul, Minn., and Flanley Grain Co., J. E. Cathcart, Treas., 509 Warnock Bldg., Sioux City, Ia., lessee, awarded contract for addition to grain elevator, 250,000 bu. capacity to include seventeen storage bins at Floyd River Rd. and Great Northern Ry. track, Sioux City, Ia., to Burrell Engineering & Construction Co., North Canal St., Chicago, Ill. Estimated cost $65,000. J. R. W. Davis, St. Paul, is chief engineer.

Grain Elevator — W. T. Townsend and H. Toles, Amarillo, Tex., awarded contract for the construction of a 40,000 bu. grain elevator, loading capacity maximum 140,000 bu. daily at Happy to Rochelle & Rochelle, Amarillo. $40,000. Equipment including 15 bu. automatic scale and 15 ton truck scale will be installed.

Grain Elevator—C. R. Vanatter & Co., Toronto, Ont., plan the construction of a grain elevator, 1,000,000 bu. capacity on waterfront, Windsor. Estimated cost $850,000.

Grain Elevators — Farmers National Grain Corp., c/o M. G. Pence, Mgr., Ogden, Utah, is having preliminary plans prepared for the construction of a grain elevator, 100,000 bu. capacity at Soda Springs, Idaho, and Blue Creek, Utah; also has work under way on a 130,000 bu. elevator at Lewiston, Idaho, by day labor. Estimated cost $50,000 each. Owner is contemplating a number of such elevators in Utah and Idaho.

Grain Storage Elevator—Archer-Daniels-Midland Co., 600 Roanoke Bldg., Minneapolis, Minn., manufacturers of linseed oil, awarded contract for addition to grain storage elevator, 7,000,000 bu. capacity to include 126 cylindrical tanks, each 152 ft. high at 29th Ave. S. E. and Chicago Great Western R.R. tracks to McKenzie-Hague Co., 422 Corn Exchange, Minneapolis. Estimated cost $750,000. Excavation started.

Wheat Elevator — Farmers National Grain Corp., R. J. Stephens, Mgr., Spokane, Wash., awarded contract for a 750,000 bu. wheat elevator, to include fourteen tanks each 24 x 100 ft. in addition to twenty-two bins in 40 x 60 ft. workhouse to Aloway & Georg, Hutton Bldg., Spokane. Estimated cost $250,000.

Food Products Plant — Kellogg Food Co., Battle Creek, Mich., will soon award contract for a 3 story, 60 x 80 ft. plant at London, Ont. Albert Kahn, 1000 Marquette Bldg., Detroit, Mich., is architect. John Thompson, 201 Victoria Rd., Walkerville, Canadian Representative.

Grocery Distribution Plant—Kroger Grocery & Baking Co., 35 East 7th St., Cincinnati, O., awarded contract for a 1 and 2 story, 250 x 300 ft. grocery distribution plant at Carbondale, Ill., to H. K. Ferguson Co., Hanna Bldg., Cleveland, O.

Health Products Plant—Health Products Co., 113 North 13th St., Newark, N. J., awarded contract for addition and alterations to plant to Eustice Bros., 111 Academy St., Newark. Estimated cost $40,000.

Salt Plant—Texas Salt Products Co., R. L. Drake, V. Pres. and Gen. Mgr., 135 East 42nd St., New York, N. Y., will build a salt plant at West 35th St. and Sapulpa Road, West Tulsa, Okla. Estimated cost $800,000. Work will be done by local labor.

Evaporating and Packing Plant — Valley Evaporating Co., Yakima, Wash., will build a new 1 story, 100 x 108 ft. evaporating and packing plant for apples at Wenatchee. Estimated cost $50,000. Work will be done by day labor.

Citrus Experimental Building— University of California, Los Angeles, Calif., is having plans prepared for a 2 story, 70 x 100 ft. citrus experimental building at Riverside. G. S. Wilson, 3646 West 9th St., Riverside, is architect.

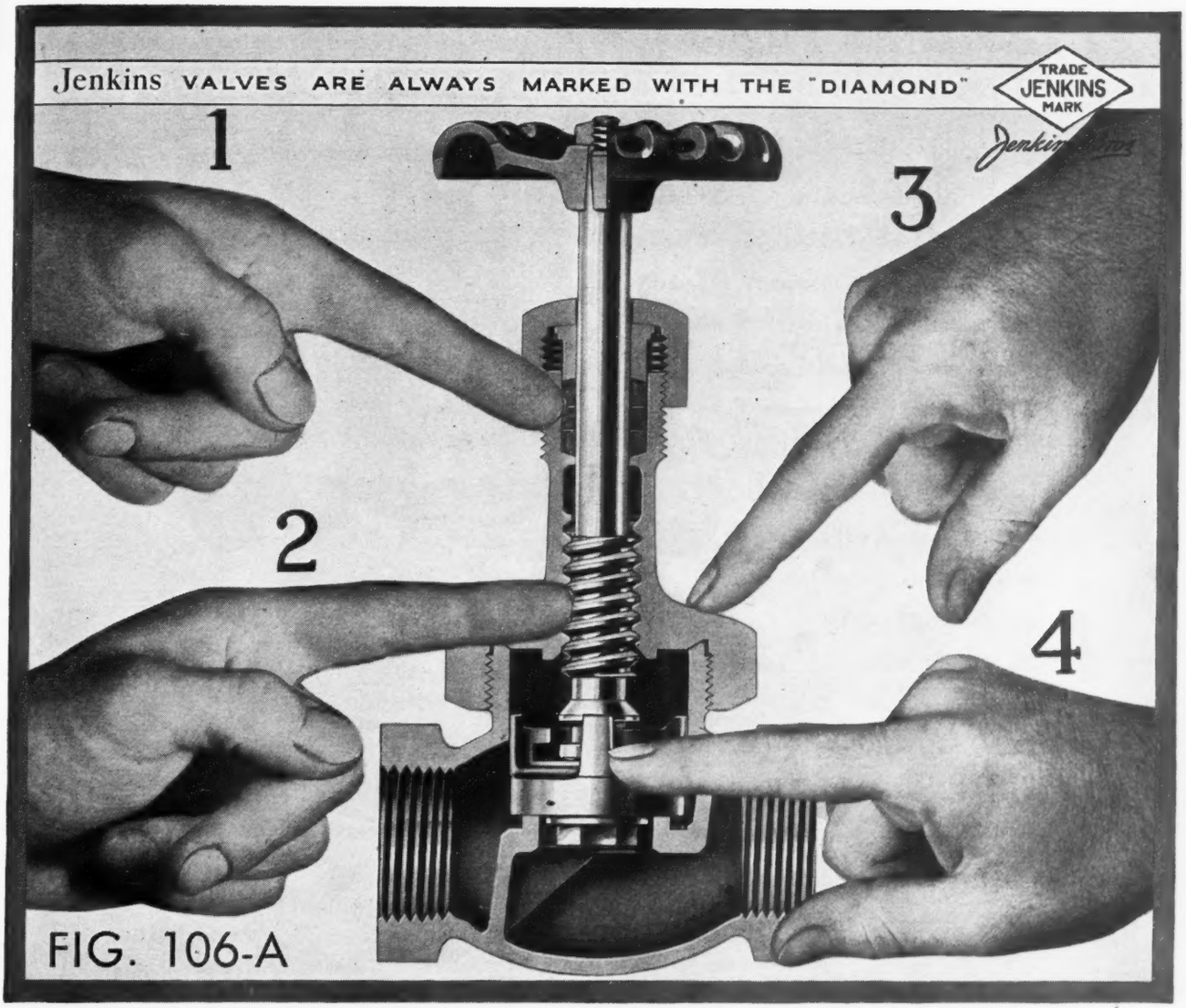
Fruit Packing Plant—Repp Orchard Product Co., Glassboro, N. J., awarded contract for a 3 story, 70 x 130 and 75 x 100 ft. packing plant to Industrial Construction Co., Broad and Allegheny Sts., Philadelphia, Pa.

Packing Plant (Citrus)—Citrus Fruit Growers Exchange, c/o J. Shary, Pres., Mission, Tex., will soon receive bids for the construction of a 2 story citrus packing plant near Edinburg. Estimated cost $75,000. H. H. Shary, Mission, is architect.

Packing Plant (Citrus) — A. C. Richter, Laredo, Tex., plans the construction of a citrus fruit packing plant, two carloads daily capacity. Estimated cost $25,000. Private plans. Equipment will be required.

Packing Plant (Citrus)—Texas Citrus Fruit Growers Association, San Benito, Tex., will soon award contract for the construction of a 1 story, 60 x 100 ft. citrus packing plant at Sharyland. H. H. Ewing, Mission, is architect. Equipment will be required.

Poultry Warehouse — Pacific Co-Operative Poultry Producers, 361 East Washington St., Portland, Ore., awarded contract for a 2 story, 100 x 200 ft. warehouse, dressing and packing plant, office, etc., at 360 East Ash St., to Stebinger Bros., Worcester Bldg., Portland. Estimated cost $50,000.



Sectional view, Fig. 106-A Jenkins Standard Bronze Globe Valve, Screwed. For 150 lbs. steam or 250 lbs. water working pressure.

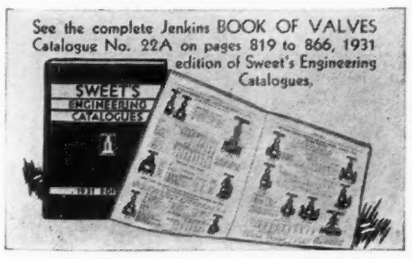
1. Extra deep stuffing box. 2. More spindle threads in contact. 3. One-piece screw-over bonnet. 4. Slip-on stay-on disc holder.

STRENGTH dominates in this new Fig. 106-A Jenkins Standard Bronze Globe Valve. In the liberal proportions of the parts, in the generous quantity of metal, as in the uniform and skillful distribution of this metal, stamina and endurance are apparent.

The bonnet is a single solid piece. No chance here of any distortion or springing, even after the bonnet has been removed and replaced repeatedly. Generous hexagon faces provide a good grip for the wrench.

Then there is the slip-on stay-on disc holder. This, like the one-piece screw-over bonnet, is an exclusive Jenkins feature. It makes possible renewal of disc quickly, conveniently and safely.

A study of the sectional view above will reveal other advantages. Fig. 106-A and the corresponding valves in angle, cross and check patterns offer this extra value at no extra price. At your supply house.


See the complete Jenkins BOOK OF VALVES Catalogue No. 22A on pages 819 to 866, 1931 edition of Sweet's Engineering Catalogues.
SWEET'S ENGINEERING CATALOGUES

JENKINS BROS.

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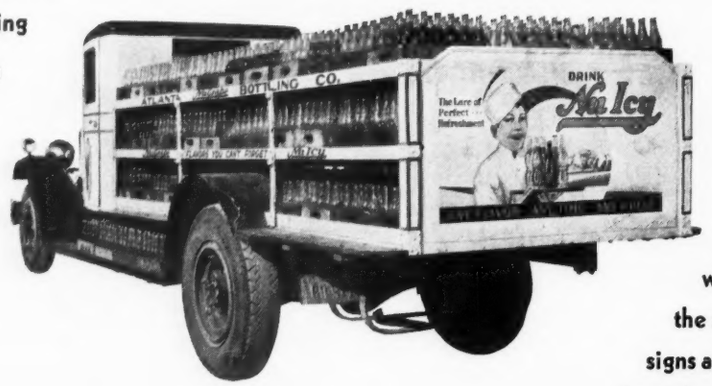
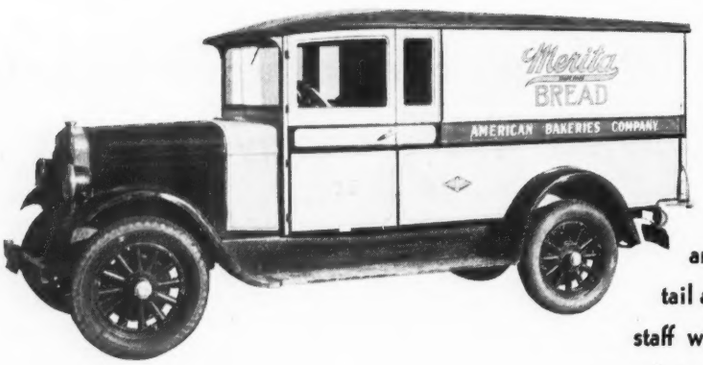
BRONZE IRON STEEL
VALVES
Since 1864

ACTUAL experiments conducted during the war placed truck panels first among effective advertising mediums. Progressive firms experimented further. Each test showed greater potential possibilities. Now national advertisers have adopted Meyercord Weather-Tested truck transfers as the most economical method of utilizing this valuable space and by so doing are actually paying for their trucks in increased sales.





The artists who make the original designs and lettering for Meyercord are among the most talented outdoor advertising experts in the country and the transfer re-creations of their designs duplicate hand work in size, originality and appearance but are more durable, more accurate in detail and far more colorful. This competent staff will assist you in utilizing your truck panels to get maximum returns. Color schemes and designs will be submitted without cost to you.

Let Advertising Pay For Your Trucks

TURN THIS FREE SPACE TO PROFIT

THE advertising space on streets and highways is at a premium. Good roadside locations are difficult to find and expensive to rent but—your own trucks parading before thousands of motorists and pedestrians every day offer you excellent billboard space without cost. Utilize this valuable media by adorning it with an illustration of your product in actual colors—a reproduction of your trade-mark or some eye-catching insignia distinctly your own and make your trucks turn their sides to profit.

With Meyercord Weather-Tested truck transfers you can convert your whole fleet into moving billboards in less time than it now takes to hand letter one truck.

MEYERCORD *weather tested* TRANSFERS

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PASTEURIZERS PROCESSING KETTLES . . COFFEE URNS
BOILERS AIR CONDITIONING EQUIPMENT
TANKS HOT WATER SUPPLY SYSTEMS
VATS STORAGE WATER HEATERS
TUBS MIXERS AND KNEADERS
DYE EQUIPMENT
AIR MACHINES
MA . . BLEACHERS
CURI . . HOT TABLES
COOL . . . HEATERS
DRYERS MACHINES
HOT TABL TANKS . . VACUUM PANS
DIPPING VATS TANKS . . VACUUM STILLS
SLIMING MACHINES . . . PADDING MAC . . . MELTING KETTLES
SYRUP HEATERS . . . REACTION KETTLES . . CAUSTICIZING TOWERS
REACTI SLASHER SIZE BOXES
JUICE H VATS
SCALDI TUBS
BOILER KIERS
SMOKE
HOT T
EVAP DIPPING
IMPREG ROOMS
DEOD PANS
SLASH GE TANKS
CURING VATS
PADDI UUM DRYERS
VACUU MIXERS
PICKLIN GESTERS
CAUSTI ORK ROOM
STORA WASHERS
REFRIGERATORS AND COLD STORAGE ROOMS . . . DYEING MACHINES
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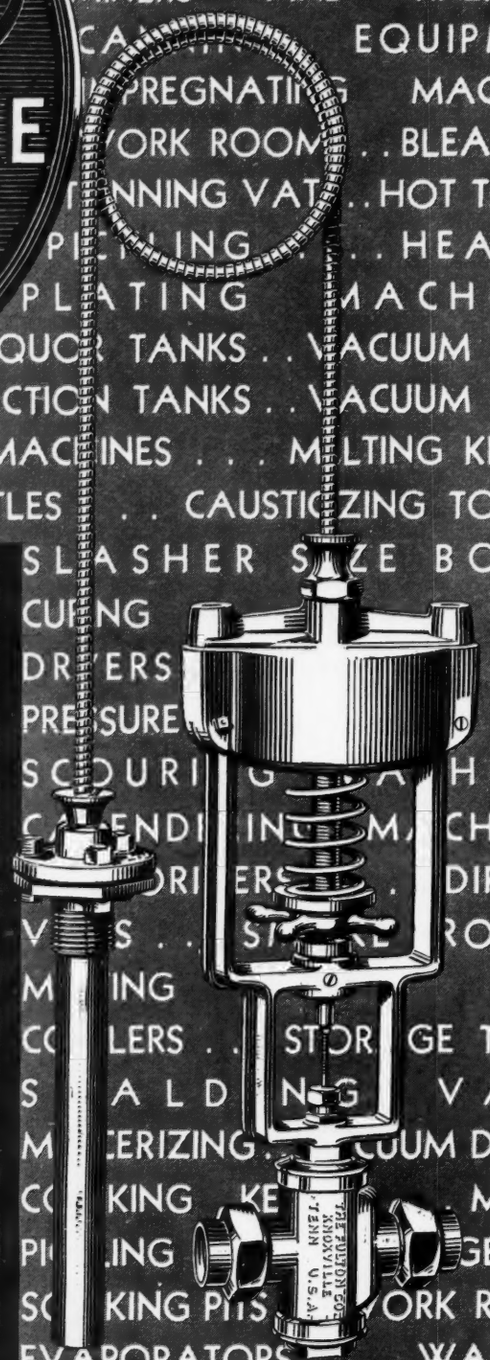
FULTON Sylphon TEMPERATURE CONTROL

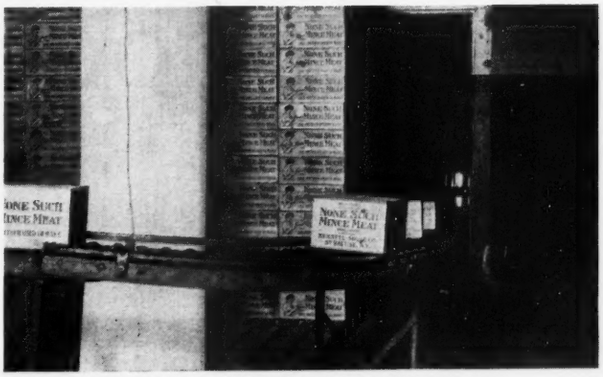
To automatically control temperature in manufacturing processes is to control uniformity of product . . . permitting consistent high quality, freedom from spoilage and seconds, lowered production costs, more attractive prices to meet competition, and increased sales and customer good-will. » » Fulton's years of experience as specialists in the design, manufacture and application of temperature control equipment to practically every known purpose for accurate maintenance of temperatures ranging from 40° below to 340° above, assures expert, helpful assistance on *your* temperature regulating problems. » » When you think of temperature control . . . think of FULTON. Write, stating the nature of your requirements.

FULTON SYLPHON CO.
KNOXVILLE, TENN., U.S.A.

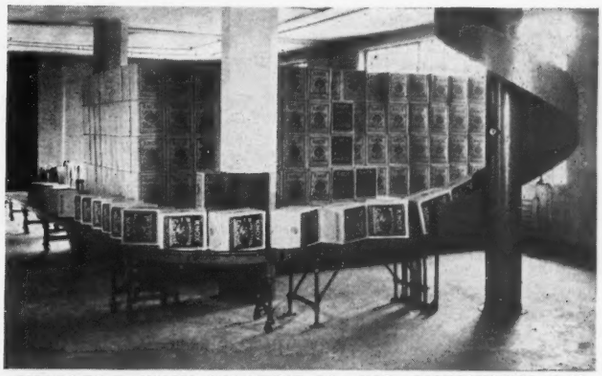
REPRESENTATIVES IN ALL PRINCIPAL CITIES IN U.S.A.



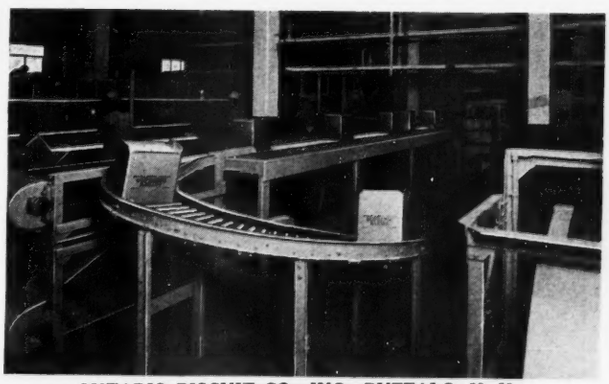
Meet the New Competition with Straight-Line Production



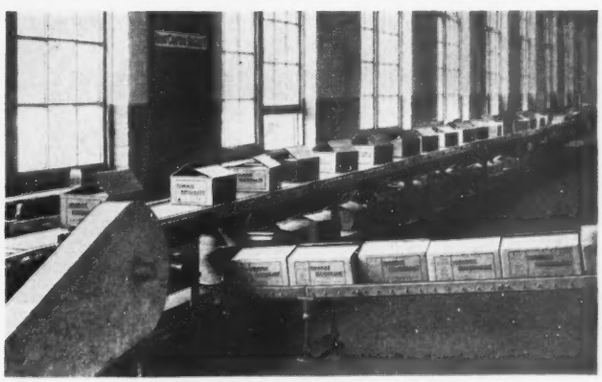
MERRELL-SOULE CO., SYRACUSE, N. Y.



CHARLES B. KNOX GELATINE CO., INC., JOHNSTOWN, N. Y.



ONTARIO BISCUIT CO., INC., BUFFALO, N. Y.



IVANHOE FOODS, IN., AUBURN, N. Y.

TO-DAY'S competition is both the cause and the effect of better products, better organized selling structures, more efficient manufacturing methods. Research in every branch of industry is continually at work to improve the product itself, its manufacture, and its sale.

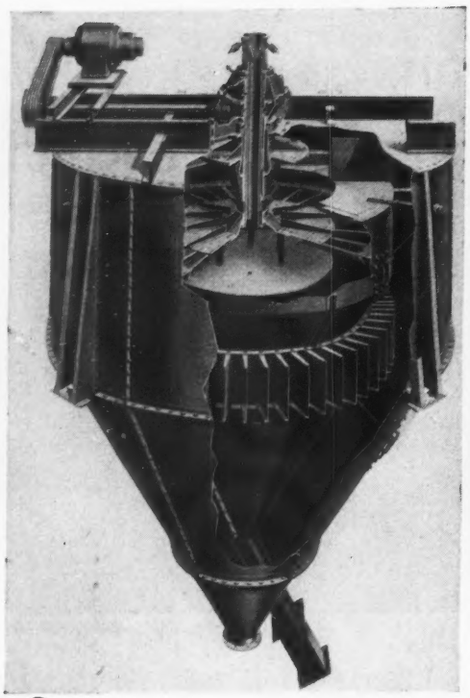
Of utmost importance to the manufacturer competing in the national or in the world market is low-cost, efficient manufacturing based on straight-line production. And efficient conveyors are the life streams of straight-line production. Lamson conveyors carry materials to men and machines in a steady, uniform flow and enable them continually to do their most productive work. They clear crowded "bottle necks" and level the daily peaks and valleys of work. In short, Lamson conveyor systems bring materials into the plant, through it, and out to the loading platform in the least possible time and at the lowest possible cost.

Find out what conveyors will save you—without cost or obligation.

Lamson engineers, experts in the routing of materials, are thoroughly trained in the science of lowering production costs through the correct application of conveyors. Their analysis of your plant may reveal worth-while potential savings. This service will cost you nothing —simply write or wire the main office and a qualified engineer will call.

THE LAMSON COMPANY, SYRACUSE, N. Y.
Offices in Principal Cities

LAMSON CONVEYOR SYSTEMS



Uniform separation *is the answer to* Quality Demands

You can now produce the finer grades of powdered food products—*better and cheaper*—by adding the Raymond Mechanical Air Separator to your pulverizing equipment.

It operates with any type of mill, and takes over the entire work of classifying the material, delivering a product of *constant uniformity* regardless of the rate of feed or fineness of grind.

The results obtained by a leading chocolate concern in the Mid-west are typical:—Here, the ground cocoa is put through a cooling box after leaving the pulverizer, then fed into a Raymond Separator. This classifies the product into the different grades, the finest being 99% passing 200-mesh. The tailings are discharged to a regrinding mill, then to the separator, making a closed circuit operation that is absolutely dustless.

If you want to improve the marketability of your product, get the facts about Raymond equipment. Just fill in the coupon, or pin it to your letterhead, and mail today.

RAYMOND BROS.
IMPACT PULVERIZER CO.
Main Office and Works
1310 North Branch Street, Chicago

342 Madison Avenue, New York
Subway Terminal Bldg., Los Angeles

Raymond Bros. Impact Pulverizer Co.
1310 North Branch St., Chicago, Ill.
Gentlemen: Kindly send me the Raymond SEPARATOR BULLETIN.
I am interested in separating ..... (Mention product)
Name of Company .....
Individual .....
Address .....

It doesn't pay to patch floors

When you start to patch you keep right on patching forever—and then you've got nothing.

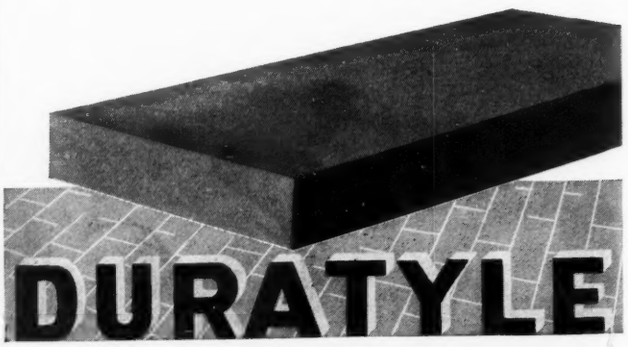
Install a **Duratyle Floor** and you have a floor that is hard-surfaced, non-porous and tough. A floor that will resist chemicals, heavy trucking—all the conditions that destroy ordinary floors. A floor that will give you years of trouble-free service—that will cost nothing for maintenance.

We can lay **Duratyle** right over your present floors. Let us tell you all about it.

DREHMANN

PAVING & CONSTRUCTION CO.

508 Glenwood Ave., Philadelphia, Pa.



Clean Air!

Prevents Bacterial Contamination . . . Reduces Upkeep Costs . . . Promotes Employee Efficiency . . . Protects Quality in Mass Production

Showing a 24-hour collection of dust by American Air Filters in a normally clean manufacturing plant.

THE modern manufacturer and packer of food products takes scientific precautions to make furnishings, equipment and utensils thoroughly sanitary. Materials must pass the strictest tests. Employees must be spotless. But as long as doors and windows admit dust-laden air, the purity and keeping qualities of products are endangered.

Today, there is rapidly growing recognition of the values of filtered air, not only as an essential to cleanliness, but also as the solution to many problems concerning quantity production, contamination and spoilage. Food manufacturers have found that bacteria and mold spores in unfiltered air settle on the product, destroying both its purity and its keeping qualities.

The U. S. Gelatine Company of Carrolville, Wisconsin, believes that filtered air is, to a great degree, responsible for the high quality of its product. The air filters not only serve the usual purpose of providing uniformly clean, bacteria-free air, but they are used to provide clean air for drying,---an important step in the manufacturing process.

American Air Filters can solve *your* air cleaning problems. Without obligation, write for information showing actual savings that have been effected in upkeep, in prevention of contamination, in improved and increased production. American Air Filter Co., Factory and General Offices, 117 Central Ave., Louisville, Ky.

AMERICAN AIR FILTERS

AMERICAN

AMERICAN SHEET AND TIN PLATE COMPANY PITTSBURGH

STEEL SHEETS *for* EVERY PURPOSE

FOR all applications in which appearance and beauty, effective resistance to corrosion, and unusual physical properties are important considerations, use

CHROMIUM-ALLOY STEELS *Ferritic*

USS 12
USS 17
USS 27

USS

CHROMIUM-NICKEL STEELS *Austenitic*

USS 18-8
USS 18-12
USS 25-12

Stainless and Heat Resisting Steel Sheets and Light Plates

THESE alloy steel products are giving a most satisfactory answer to the question—*what metal is adaptable?* In a variety of grades and finishes, U S S Stainless Steel sheets and light plates are produced by the American Sheet and Tin Plate Company. Diversified applications are readily found in the construction of buildings, automobiles, furniture, apparatus for refineries and chemical plants, as well as in the fabrication of numerous articles and fittings used in factory, store and home. Your selection of sheets and light plates for particular requirements may be made with the assistance of our technologists and sales forces, who will be glad to serve you. Descriptive literature will be furnished promptly upon request.

This Company manufactures high grade sheet and tin mill products for all known uses. Write for information on AMERICAN Black and Galvanized Sheets, Special Sheets, Tin and Terne Plates; and KEYSTONE Rust Resisting Copper Steel Products.

American Sheet and Tin Plate Company

GENERAL OFFICES: Frick Building, PITTSBURGH, PA.

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

PRINCIPAL SUBSIDIARY MANUFACTURING COMPANIES:

AMERICAN BRIDGE COMPANY
AMERICAN SHEET AND TIN PLATE COMPANY
AMERICAN STEEL AND WIRE COMPANY
CARNEGIE STEEL COMPANY
COLUMBIA STEEL COMPANY
CYCLONE FENCE COMPANY
ILLINOIS STEEL COMPANY
FEDERAL SHIPB'LDG. & DRY DOCK CO.
MINNESOTA STEEL COMPANY
NATIONAL TUBE COMPANY
OIL WELL SUPPLY COMPANY
THE LORAIN STEEL COMPANY
TENNESSEE COAL, IRON & RAILROAD CO.
UNIVERSAL ATLAS CEMENT COMPANY

Pacific Coast Distributors—Columbia Steel Company, Russ Bldg., San Francisco, Calif.

Export Distributors—United States Steel Products Company, 30 Church St., New York, N. Y.

THE American public is rapidly becoming tomato juice conscious. It is conscious of a new, delightful, and refreshing drink that is both a food and a snappy appetizer. When purchasing this product, the public rightfully demands a product that is dependably uniform—uniform in flavor, uniform in color, and uniform in texture and consistency. These demands are not unreasonable and can be complied with by any careful manufacturer. This relatively new product holds great possibilities for the tomato canner and its future rests in the hands of those manufacturing it. It will not be a passing fad unless the consumer is disappointed in his purchase. The packer who insists on producing an inferior product, such as that made

"Food Industries" March, 1931

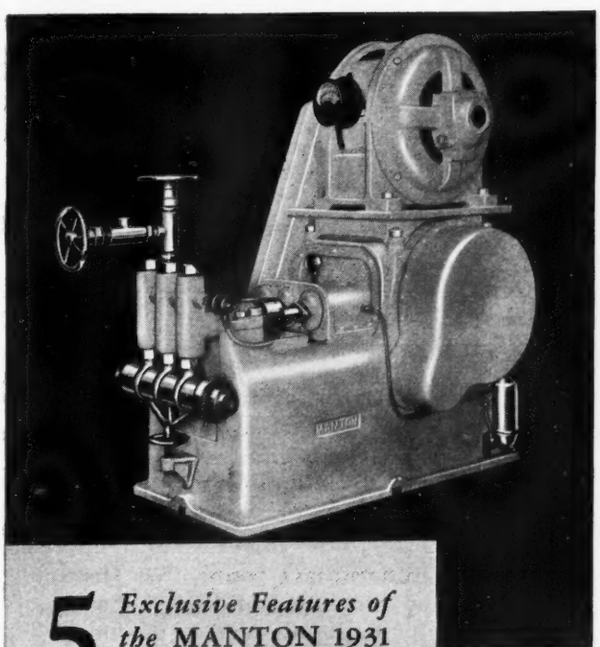
Get UNIFORMITY in emulsified products *with* HOMOGENIZATION

The above excerpt is taken from an article by Mr. R. H. Winters of the American Can Co. in "Food Industries" for March, 1931. What he says about tomato juice is true about other emulsified products. *They must be uniform*—"*uniform in flavor, uniform in color, uniform in texture and consistency.*"

The MANTON 1931 Homogenizer gives you a *uniform* emulsion. More than that, it produces a permanent, stable emulsion, that won't separate, no matter how long your product is to stay in storage.

Besides a number of exclusive operating features, one important point stands out in the new MANTON 1931—it gives you greater production per dollar investment than any other homogenizer. Operating and maintenance costs are low. Initial investment is down to a minimum.

Homogenization protects user and retailer good-will. It boosts sales. And it does away with all the waste that occurs when separation of your emulsion takes place in process. Executives interested in improving their product and reducing waste will want the new MANTON 1931 Catalog, sent on request.



5 *Exclusive Features of the* MANTON 1931 HOMOGENIZER—

1 ***Stellite Metal*** in the suction and discharge valves—the same hard metal that is used in the Homogenizing valve. Attention required becomes negligible.

2 ***Cutout Switch*** — automatically protects against breakage from sudden high pressures.

3 ***Removable Manifold*** — independent of the cylinder, gives extremely large screen area.

4 ***New Designed 2-Stage Valve***—can be swung into most desirable position. No pockets for bacteria.

5 ***Filtered Oil*** to all important bearings under pressure.

NOTE

In the laboratories of Skinner and Sherman, Inc., Boston, Mass., we maintain a complete homogenizing unit. Use this to experiment with your emulsions. Send in samples, and the emulsified product will be shipped to you. No charge for this service. No obligation on your part. Also available to you, at no cost, is an experience with countless emulsions that will help bring experiments to a successful conclusion, and establish an economical manufacturing process in your plant.

MANTON-GAULIN MFG. CO.

INCORPORATED

St. Johnsbury Vermont

●*Flour milling is but one of the many branches of the food industry in which Diamond Crystal Salt has opened the way to greater success. We should be glad to send you detailed information regarding the selection of the salt best suited to your own product*

"I'll never buy that brand of flour again" SAYS MRS. CONSUMER,

who always misinterprets shotballs

MILLERS know that shotballs are caused by the presence of calcium chloride in the salt. A spoonful of calcium chloride is capable of absorbing all the moisture contained in 80 cubic feet of air. Just a trace of this impurity, just a few particles the size of pin points are likely to form suspicious looking little balls of flour.

The housewife doesn't know that a shotball is really quite harmless. During her experience with other types of flour, she has encountered similar looking little balls—and they've turned out to be tiny worms. Naturally, when she sifts her self-rising flour—and finds shotballs, she takes it for granted that they too are worms—and it's a safe bet she won't buy that same brand of flour soon again.

Diamond Crystal Salt is unique in its freedom from calcium chloride. To use this pure salt, is to be sure that your flour will not suffer from shotballs. Diamond Crystal Salt is also free from impurities which impart bitter flavor to flour, and hence to pancakes and biscuits.

Because of its purity, this famous salt is matchlessly white—identical in shade with well bleached flour. It flows freely and scoops easily from barrel or sack. Being free from heavy impurities and being flaked, its particles remain evenly mixed throughout the flour, and do not sink to the bottom of the package during the jouncing journey from mill to pantry. Most important of all, its mild and appetizing flavor brings out all the flavor of the wheat, and gives the flour memorable goodness.

Hundreds of millers have found that Diamond Crystal Salt aided them in building the sales of quality flour. Why don't you too take advantage of its benefits, especially since the cost of salt is such a small fraction of the total cost of the flour? Diamond Crystal Salt is made by the exclusive Alberger process. Diamond Crystal Salt Company, (Inc.). *Bulk Department*, 250 Park Avenue, New York, N. Y.

Year in, year out, Diamond Crystal Salt averages 99.9% pure—or better

DIAMOND CRYSTAL SALT

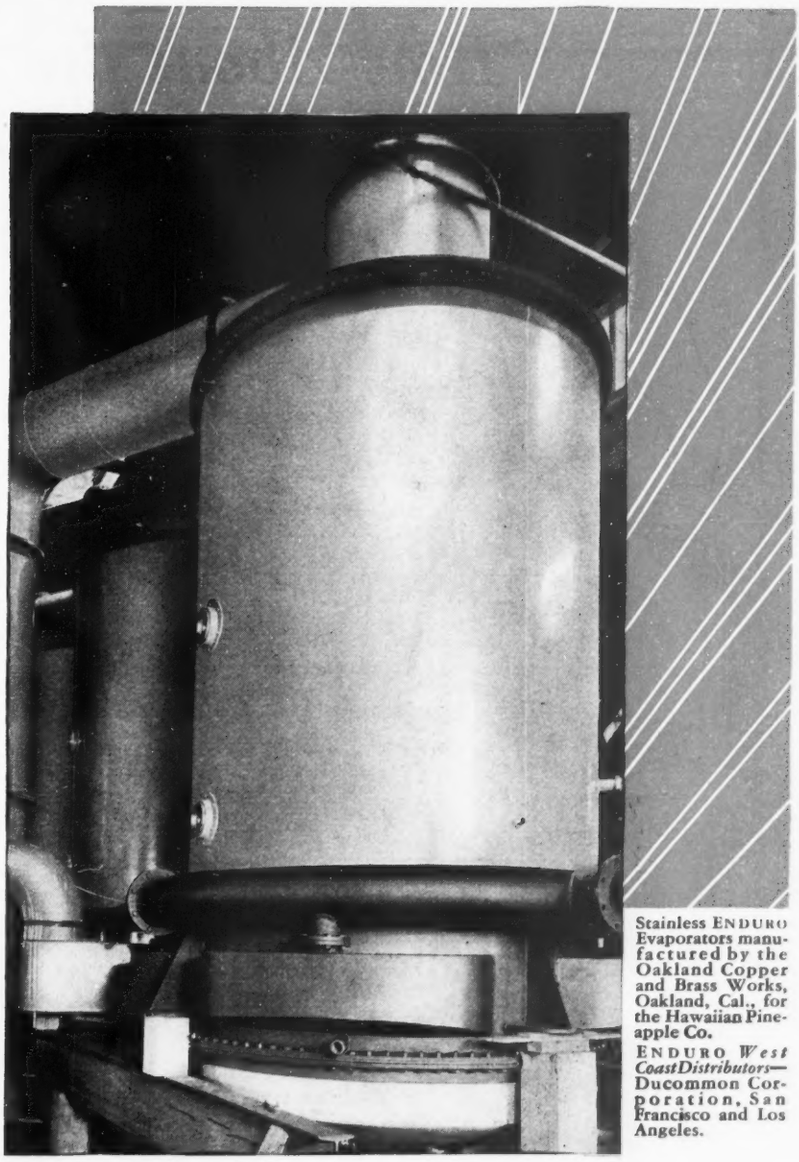
A PRODUCT OF GENERAL FOODS CORPORATION

© 1931, G. F. Corp.

To PROTECT COLOR and FLAVOR

THESE HUGE EVAPORATORS WERE MADE FROM

ENDURO
REPUBLIC'S
PERFECTED STAINLESS STEEL



Stainless ENDURO Evaporators manufactured by the Oakland Copper and Brass Works, Oakland, Cal., for the Hawaiian Pineapple Co.

ENDURO *West Coast Distributors*—Ducommon Corporation, San Francisco and Los Angeles.

Because of the unequalled corrosion-resisting properties of ENDURO KA2, and its permanent mirror-like surface, the food industry is specifying this perfected stainless steel for all operations carried out under vacuum.

ENDURO has entirely eliminated any danger of metallic content in the finished product. In addition, food products processed in ENDURO equipment retain a more natural color, and flavor.

For your next equipment, be sure you specify that it be made of safe, economical ENDURO throughout, for this insoluble metal is available in all forms including seamless tubing. Write Republic now for complete information.

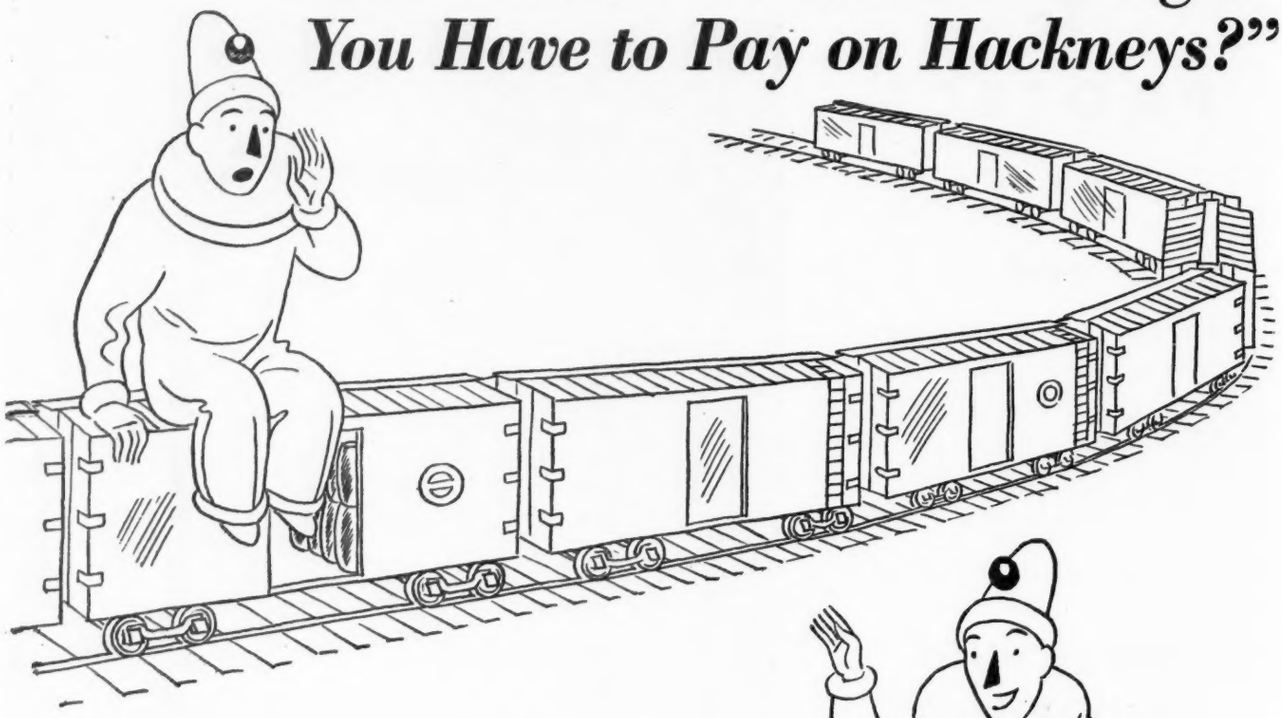
ENDURO

Enduro KA2 is sold only through Republic Sales Offices and authorized Distributors.

CENTRAL ALLOY DIVISION
REPUBLIC STEEL CORPORATION
Massillon, Ohio

Licensed under Armstrong, Krupp—Nirosta, American Stainless and Chemical Foundation patents

"How About the Return Freight You Have to Pay on Hackneys?"



"That's Mighty Little Compared to the Cost of Buying New Light-Weight Containers—Every Trip"

Records of many leading companies show that Hackney Seamless Steel Barrels and Drums can save as high as 50% in shipping costs over single trip containers.

And in addition to return freight, these figures include interest and depreciation on the original investment in Hackneys—maintenance—cleaning—insurance—clerical costs to keep track of containers—and extra freight on out-shipments due to greater weight.

Let us consult with you on the advisability of shipping your liquid or dry bulk materials in Hackney permanent steel containers. We may be able to work out a plan which will mean a substantial saving in your shipping costs.

PRESSED STEEL TANK COMPANY

1173 Continental Bank Bldg. . . . . Chicago
1349 Vanderbilt Concourse Bldg. . . . . New York City
5771 Greenfield Avenue . . . . . Milwaukee, Wis.
477 Roosevelt Bldg. . . . . Los Angeles

Hackney
MILWAUKEE

BOWEN SPRAY DRYING

Offers unlimited possibilities for the

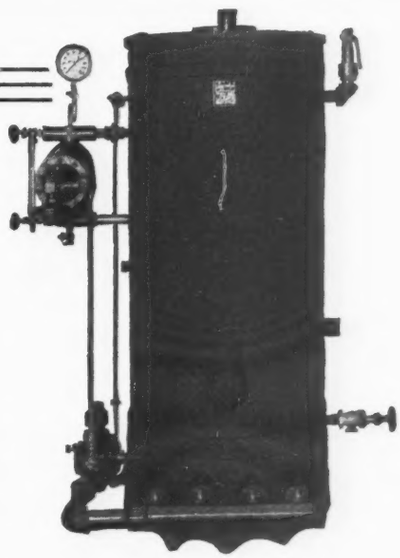
CREATION OF NEW PRODUCTS FOR THE FOOD OR CHEMICAL INDUSTRIES

Arrangements can be made to secure the use of our spray drying laboratory for practical or experimental tests on your product . . . Our personnel is highly trained with years of successful experience in the spray drying art.

BOWEN RESEARCH CORP., 117 Liberty St., New York City

KANE

high-pressure Process Steam with gas-fired Advantages . . . . . for Special Food Processes



While high pressures in steam process work do not as a rule run over 100 lbs., there are many special industrial processes and experimental laboratories requiring extra high pressures—with all the advantages of gas-firing.

For instance, the Bell Telephone Laboratories use three special KANE boilers: One 5 hp. built for 250 lbs., a 7 hp. for 225 lbs., and another 7 hp. for 250 lbs. Brooklyn Polytechnic Institute uses a 10-hp. KANE built for 250 lbs. for experimental work. And in the food Industries KANE boilers are used for a wide range of pressures—

Kane boilers are chosen for high pressures as well as standard pressures because of KANE advantages: Compactness, automatic operation, cleanliness, reduced labor costs, safety, and stability of steam pressure and temperature at all times.

Write us concerning your special food processing problems where high pressure process steam is needed.

Send for KANE Bulletins

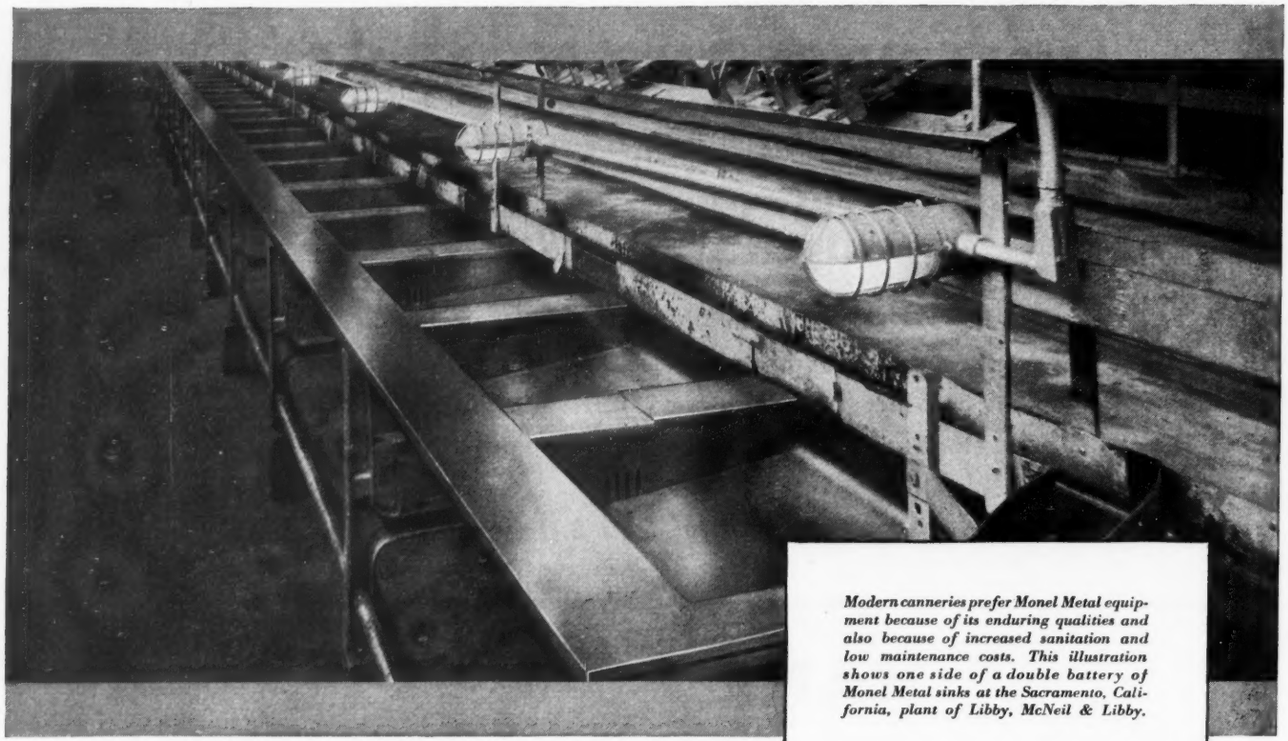
MEARS-KANE-OFELDT INC.

Executive Office and Factory
1903-1915 EAST HAGERT ST. PHILADELPHIA
Branch Offices or Distributors in Principal Cities

Makers of Automatic Gas Boilers for over a Quarter Century

MONEL METAL SINKS

"Perform better longer" IN GRUELLING CANNING SERVICE



Modern canneries prefer Monel Metal equipment because of its enduring qualities and also because of increased sanitation and low maintenance costs. This illustration shows one side of a double battery of Monel Metal sinks at the Sacramento, California, plant of Libby, McNeil & Libby.

● Few units are subject to harder wear and tear than canning plant sinks and cleaning tables. Moisture, food acids, dirt and grit and hard knocks all conspire to shorten service life and increase cleaning and maintenance costs.

To withstand these destructive physical and chemical forces, washing equipment must be rust-proof, corrosion-resisting, strong and durable. It should have no coating to chip, crack or wear off. It should resist abrasion and heavy impacts. And it should present a clean, inviting appearance at all times.

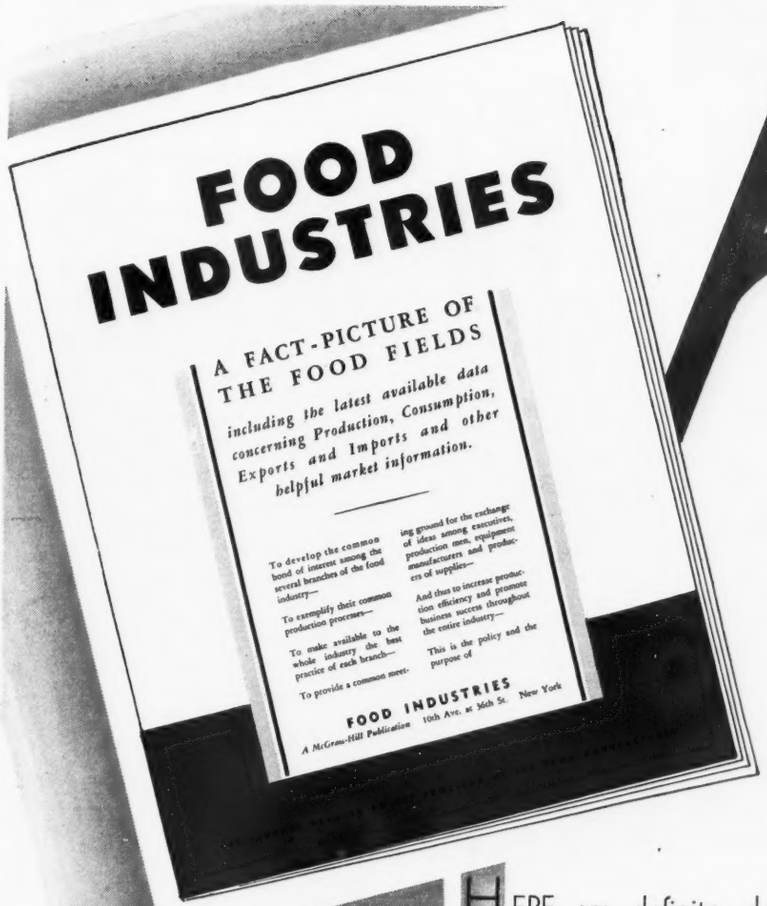
Monel Metal meets these exacting requirements better than any other equipment material. Sinks of this lustrous long-wearing Nickel alloy stand up through long periods without need of repairs or replacement. They are easy to clean and keep clean, cutting repair and replacement to a minimum.

Monel Metal sinks can be readily fabricated to individual specifications. Seamless Monel Metal sink bowls are available from stock in standard sizes. Write for further information about these modern sink bowls.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York, N. Y.

Monel Metal is a registered trade mark applied to a technically controlled nickel-copper alloy of high nickel content. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

A HIGH NICKEL ALLOY
MONEL METAL
NICKEL ALLOYS PERFORM BETTER LONGER


FOOD INDUSTRIES
A FACT-PICTURE OF THE FOOD FIELDS
including the latest available data concerning Production, Consumption, Exports and Imports and other helpful market information.
To develop the common bond of interest among the several branches of the food industry—
To exemplify their common production processes—
To make available to the whole industry the best practice of each branch—
To provide a common meeting ground for the exchange of ideas among executives, production men, equipment manufacturers and producers of supplies—
And thus to increase production efficiency and promote business success throughout the entire industry—
This is the policy and the purpose of
FOOD INDUSTRIES
A McGraw-Hill Publication 10th Ave. at 36th St. New York

Here is vital, usable information

about the Food Industries Market for your products

HERE are definite, down-to-earth facts and figures about a twelve-billion-dollar industry—about a single group of 10,511 plants that buys annually more than seven billion dollars' worth of equipment, materials and supplies.

Data on value of products—number and location of plants—amount of purchases—biggest consumption centers—imports and exports—

The kind of information you can actually **use** in making up sales plans and advertising schedules—all in one booklet that we'll send at your request and without obligation.

NO CHARGE—
JUST SEND THE COUPON

FOOD INDUSTRIES—Tenth Avenue at 36th Street, New York

Send me "A Fact-Picture of the Food Fields"

Name_____

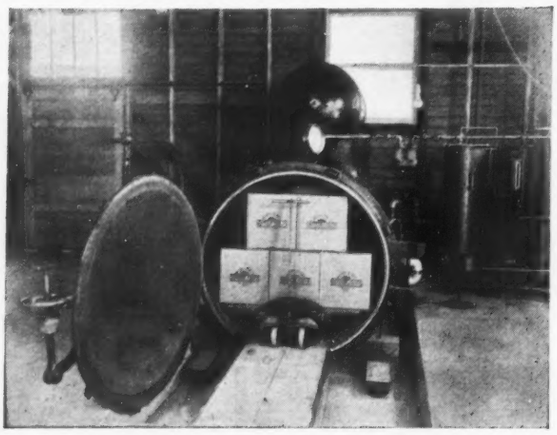
Company_____

Address_____

THERE IS NO BUSINESS MORE FUNDAMENTAL THAN THE

FOOD INDUSTRIES

McGRAW-HILL PUBLISHING COMPANY, INC., TENTH AVENUE AT 36th STREET, NEW YORK



IS YOUR PRODUCT SUBJECT TO INSECT INFESTATION?

FIND OUT ABOUT THE

Vacufume!

Picture a steel chamber. Your product in either bulk or package form inside. Vacuum pumps exhaust the air and crack open even minute larvae or egg cells.

Gases are then circulated inside the chamber. They kill any insect life that may remain.

The result is your product absolutely free from insect life . . . and free from even minute eggs that may later develop into worms or "bugs."

It costs less than ¼ cent a pound to Vacufume a product, and a Vacufume installed in your plant can be operated by any unskilled machine man.

If you will send us a sample of your product, we will gladly tell you exactly what a Vacufume will do for you. And, so that there may be no question about Vacufume efficiency in your mind, we will refer you to Vacufume users who are operating one or more Vacufume units.

A new descriptive booklet has just been issued, and will be mailed to you upon request.

UNION TANK & PIPE CO., Ltd.

Mechanical Engineers, Manufacturers of Steel Plate and Sheet Metal Products.

2801 SANTA FE AVENUE
Los Angeles, California

Let this Robot Do Your Work

It Maintains Temperatures More Accurately

The time you waste regulating valves by hand can be devoted to more profitable work by letting the Sarco Temperature Regulator automatically turn on and shut off steam, gas or hot water.

This Regulator does the work of men, without pay, year in and year out. Once set for a given temperature, it will maintain that temperature *exactly* without attention. It never tires, never guesses, never forgets.

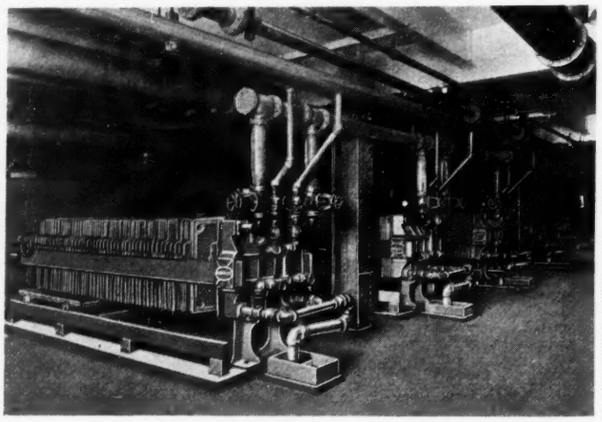
It requires no compressed air, water pressure or electricity to operate. Expensive pipe lines are eliminated.

Let us know your conditions and we will send a Sarco on 30 days' free trial.

Write for Booklet AE-70 and free trial.

SARCO COMPANY, INC.
183 MADISON AVE., NEW YORK, N. Y.
Branches in Principal Cities
Sarco Canada Limited, Federal Bldg., Toronto, Ont.

SARCO TEMPERATURE REGULATOR



SHRIVER FILTER PRESSES

FILTER DOMINO SUGAR

The American Sugar Refining Company, producers of the famous Domino Cane Sugar, employ Shriver Filter Presses, in the production of their noted food product. Domino sugar is another famous product, in the preparing of which, Shriver Filter Presses are utilized.

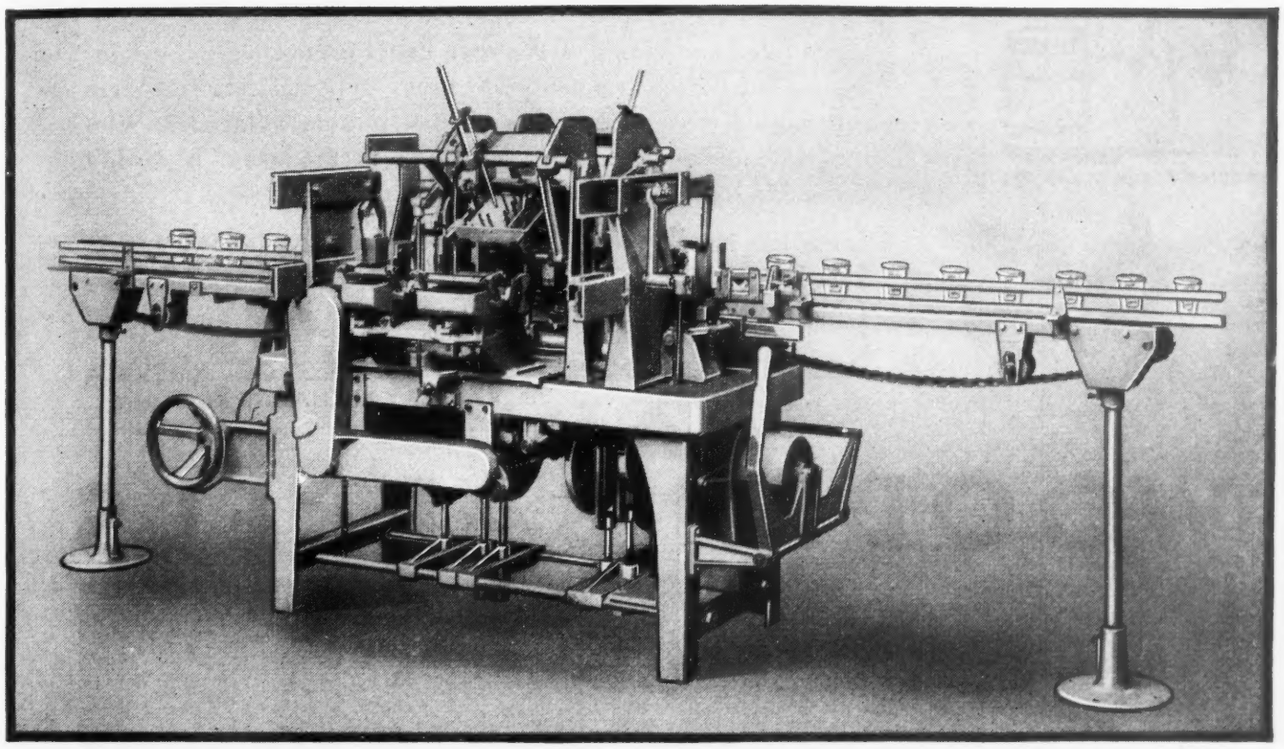
Our Engineering service will help you with your filtration problems. Your inquiries are solicited.

T. SHRIVER & COMPANY
Established 1860
860 Hamilton Street Harrison, N. J.
A Filter Press For Every Purpose

SHRIVER

Filter Presses Filter Cloth Diaphragm Pumps

Hundreds of Satisfied Users Heartily Endorse World Labelers



WORLD AUTOMATIC STRAIGHTAWAY LABELER

Two types—for face labeling or double labeling at one operation. This machine is proving an outstanding success in labeling flat, round, oval or panel bottles, jars and other packages. Various sizes handled on the same machine.

Let World Labelers solve your labeling problems.

ECONOMIC MACHINERY COMPANY

Largest Manufacturers of Labeling Machines in the World

WORCESTER, MASS., U. S. A.

WORLD LABELERS

A SANITARY PACKAGE

MADE OF FRESH CLEAN WOOD

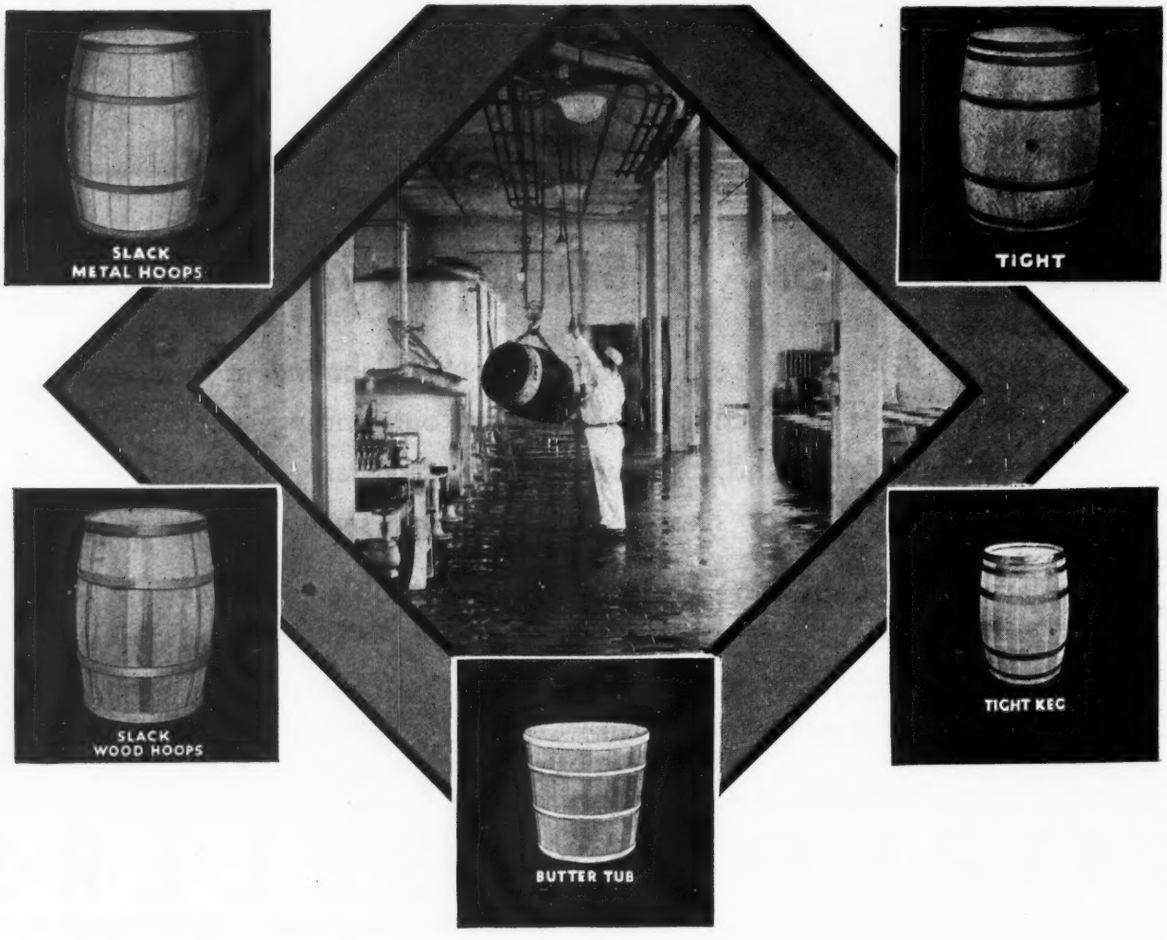
Wooden Barrels are sanitary containers. Only fresh, clean wood, that will not contaminate the contents, is used in their manufacture. The Wooden Barrel delivers your product just as it was packed.

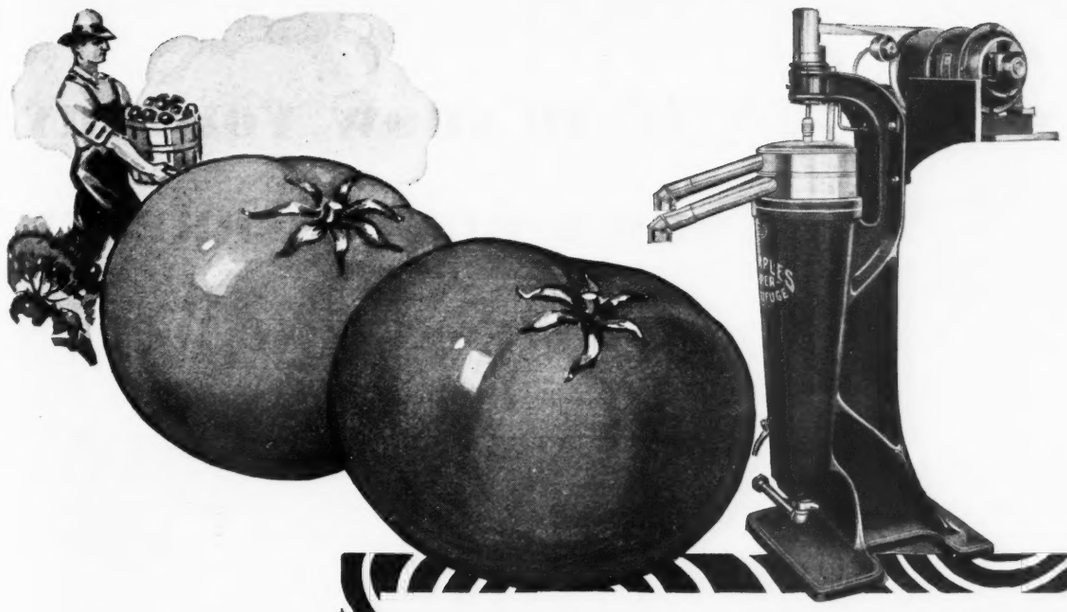
Once filled and closed, a Wooden Barrel is effectively "sealed" against dirt and contamination. Moisture only serves to seal them still more tightly against deteriorating outside influences. With the head removed, the entire interior of the barrel is readily accessible for cleaning.

There is a barrel for every product, wet or dry, light or heavy. The Cooperage Association will be glad to advise you as to the type for your needs. Send for the Wooden Barrel Booklet.

ASSOCIATED COOPERAGE INDUSTRIES OF AMERICA
RAILWAY EXCHANGE BUILDING
ST. LOUIS MISSOURI

WOODEN BARRELS





A "GREAT FORCE" GOES TO WORK ON TOMATO PULP

IN accordance with their policy of constantly improving the quality of their products, we were asked by one of the largest Food Products Companies to do the almost impossible job of removing the impurities normally present in concentrated tomato pulp.

By designing a Super Centrifuge to fit the problem, it was possible to centrifuge the impurities from concentrated tomato pulp at the rate of approximately 300 gallons per hour. This tomato pulp was discharged in the "pink of condition", possessing unusually high quality and purity. *In every test, the mold count was reduced.*

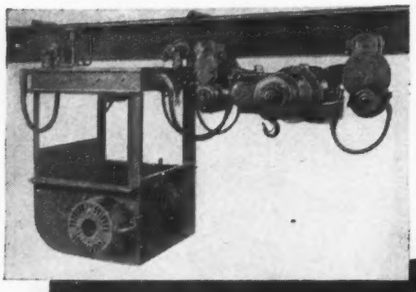
Full information on Sharples Super Centrifuges for this or any of our other food applications can be secured promptly on request.

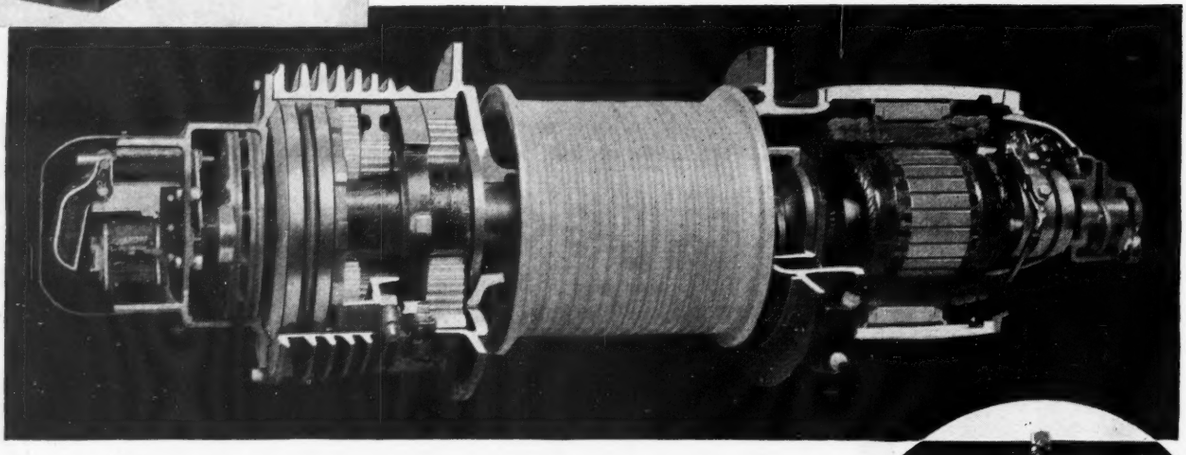
THE SHARPLES SPECIALTY COMPANY, 2315 WESTMORELAND STREET, PHILADELPHIA. Boston, New York, Pittsburgh, Chicago, Detroit, Tulsa, San Francisco, Seattle, Los Angeles.
Factories in England and France.

SHARPLES

CENTRIFUGAL ENGINEERS • • PHILADELPHIA

Cut Open TO SHOW YOU WHY SHREWD BUYERS PREFER SHEPARD ELECTRIC HOISTS





PERFECT balance of the rotating mechanism is the foundation of Shepard design. The sectional photograph shows it clearly. Electric motor, winding drum, gears, mechanical brake and electric brake, all revolve around a common axis.

This symmetry has great practical value. Load stresses on the gears are balanced. Bearing wear is reduced. Alignment is permanent. Complete enclosure is facilitated and lubrication made extremely easy and effective. Longer, efficient service with a minimum of maintenance for every Shepard Hoist is the direct result of these features.

To assure the maximum efficiency from Shepard design, and this in every hoist produced, unit construction is used. Machining with the aid of jigs and fixtures to close tolerances provides perfect duplication of parts, hence perfect duplication of all Shepard Electric Hoists, in so far as quality is concerned.

In fact a Shepard Electric Hoist is a duplication, upon an appropriate scale, in design, details of construction, workmanship and quality of materials of the hoisting unit employed in Shepard Electric Overhead Traveling Cranes. And Shepard Electric Hoists are made in such a comprehensive variety of types and speeds, capacities and controls as to assure the hoist precisely suited to the job.

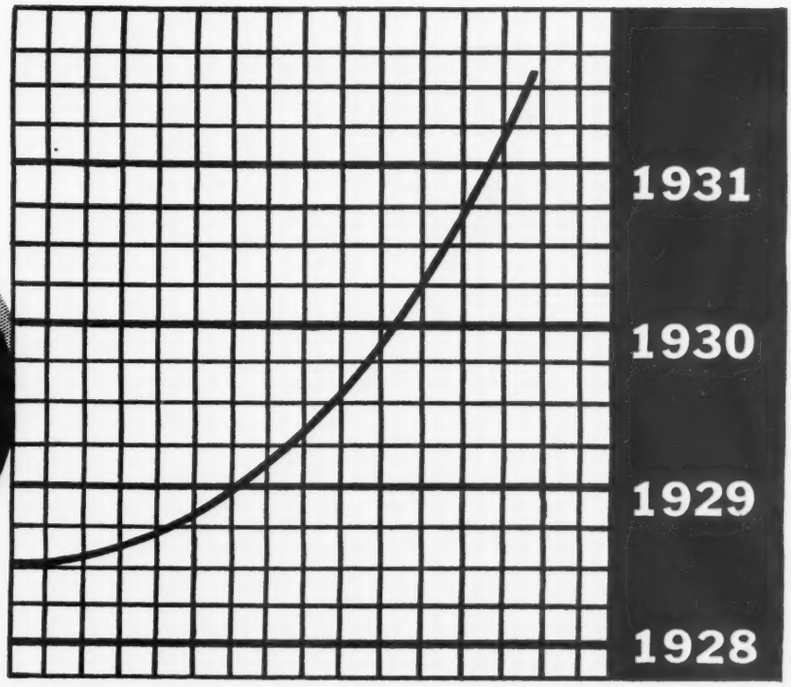
Time proves the economy of investing in Shepard Electric Hoists.

SHEPARD NILES CRANE AND HOIST CORPORATION
Main Office: 422 Schuyler Avenue, Montour Falls, N. Y.
Works: Montour Falls, N. Y., & Philadelphia, Pa. Branches in principal cities.

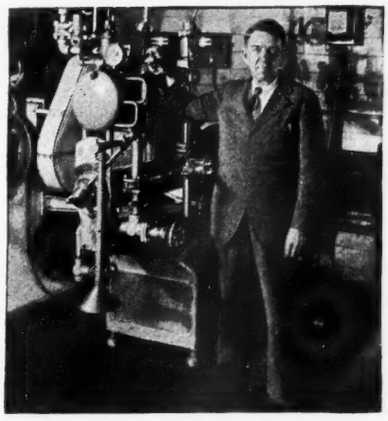
WRITE FOR A COPY OF THE SHEPARD COMPACT HOIST BULLETIN

SHEPARD
CRANE & HOIST DIVISION

THE MOST COMPLETE LINE OF CRANES & HOISTS IN AMERICA



UP GOES VOGT GALLONAGE



PACKAGE DIRECT FROM THE FREEZER

TYPICAL of ice cream manufacturers' experience with *Vogt Instant Freezers* is the report of Heyser-Myers Ice Cream Company of Battle Creek. Mr. Heyser says—"a carton or package can be uniformly filled direct from the Vogt Instant Freezer, while this is practically impossible from other freezers. The texture and quality of the ice cream are the best we know of."

THE VOGT INSTANT FREEZER has graduated from "something new" to "something proved". Today it bears the stamp of success. Ice cream manufacturers approve its operation and dealers and consumers prefer its product. In three short years the gallonage of Vogt Instant-frozen ice cream has mounted, steadily, higher and higher, until today it forms an impressive proportion of the total.

Vogt Instant Freezers are available in one-tube, two-tube and four-tube models and in capacities of from 100 to 400 gallons an hour. New models feature one-third greater production, improved pumps, simplified ammonia controls.

"COORDINATED EQUIPMENT" by CHERRY-BURRELL

CHERRY-BURRELL CORPORATION

427 W. RANDOLPH ST., CHICAGO

Baltimore, Boston, Cedar Rapids, Cincinnati, Cleveland, Columbus, Detroit, Little Falls, Milwaukee, New York City, Pittsburgh, Philadelphia, St. Paul, Syracuse

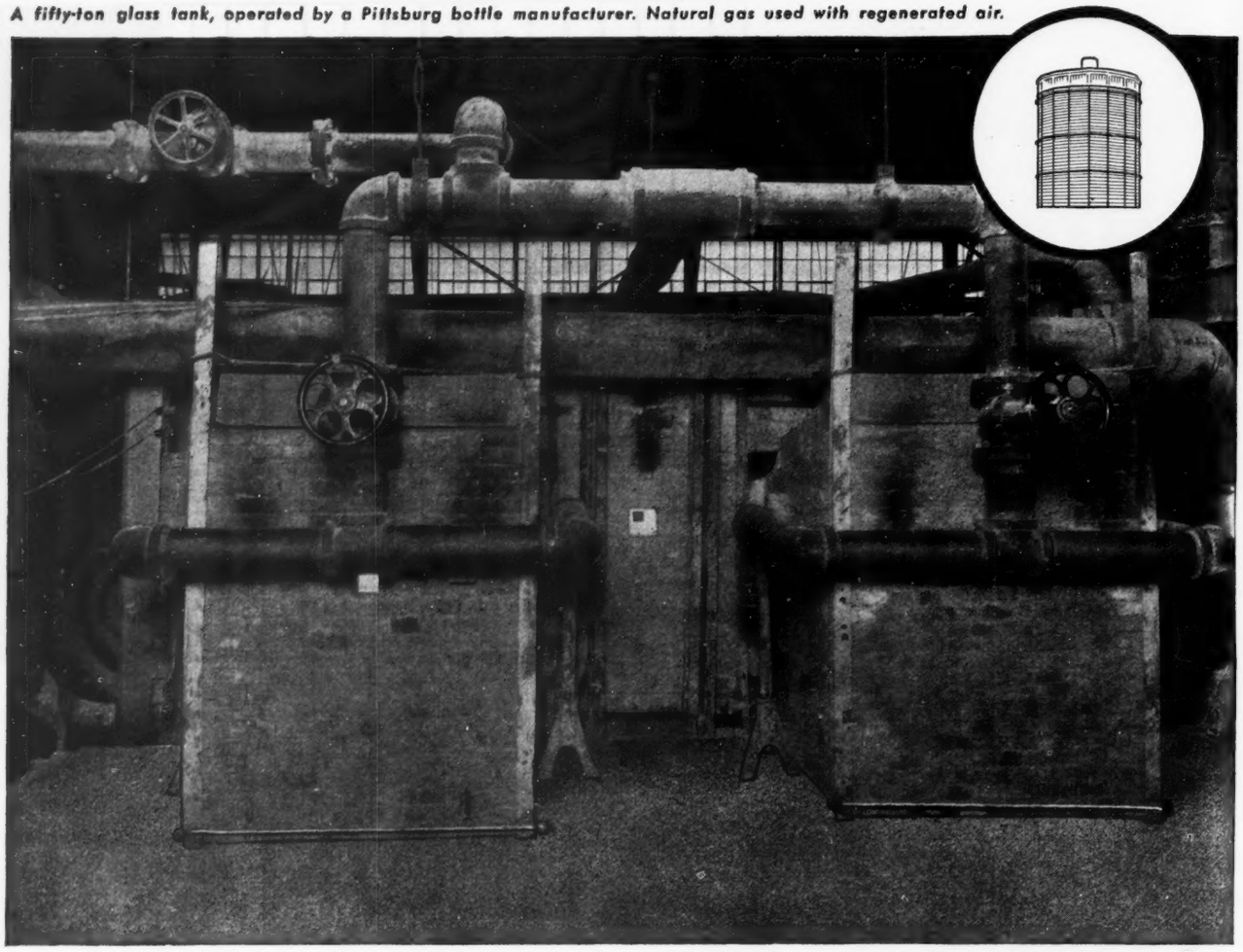
Cherry-Burrell Corporation of Canada, Ltd., Brockville, Ont.

Export Office: 31 Union Square, New York City

Cherry-Burrell, Ltd., London, England

"SMOOTHEST FROZEN IS VOGT INSTANT FROZEN"

A fifty-ton glass tank, operated by a Pittsburg bottle manufacturer. Natural gas used with regenerated air.



GLASS MAKING

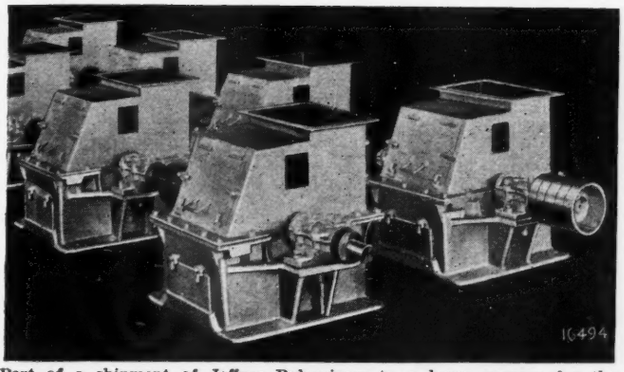
Ever since the glass industry started, gas has been its favorite fuel.

Sound reasons, too . . . accurate controllability, uniform temperature maintenance, low cost. Send for the new book "Gas Heat in Industry".

GAS FOR HEAT WHEREVER HEAT IS NEEDED

AMERICAN *Gas* ASSOCIATION

420 Lexington Avenue, New York



Part of a shipment of Jeffrey Pulverizers to a large cannery for the reduction of tomatoes for making catsup.

There is an opportunity to save money with a Jeffrey Reduction Unit

Let us present an opportunity for you to save money by using JEFFREY REDUCTION EQUIPMENT.

There are operations in your plant that can be accomplished—efficiently and economically—with a Jeffrey Reduction Unit. We can cut your operating expense by installing equipment designed to meet your particular requirements.

Jeffrey Machines are designed for low maintenance and a low power consumption; and they have the ability to handle large capacities. The following list is representative of the many materials being reduced by Jeffrey Reduction Equipment.

Algaroba Beans	Cottonseed Cake	Meat Scrap
Apples—for cider and vinegar	Cracklings	Orange Peel
Bone	Egg Shells	Oyster Shells
Bread—stale	Gelatin—Dry	Sugar
Cabbage for brant juice	Ginger Root	Sugar Cane
Castor Beans	Hoofs	Salt
Coca Beans	Horns	Sku'ls
Cocoa Hulls	Kelp	Tankage
Cocoanut Shells	Linseed Cake	Tomatoes
	Lemon Peel	Vanilla Beans
	Meat Cake	Watermelons—for vinegar

Tell us the material you want reduced and the results required. We will be glad to recommend a machine to do the job satisfactorily and economically.

The Jeffrey Manufacturing Company
927-99 North Fourth St., Columbus, Ohio

New York	Utica	Detroit	Denver
Buffalo	Boston	Chicago	Houston
Rochester, N. Y.	Scranton, Pa.	Huntington, W. Va.	Salt Lake City
Philadelphia	Cincinnati	Milwaukee	Birmingham
Pittsburgh	Cleveland	St. Louis	

Jeffrey Manufacturing Co., Ltd. of Canada. Head Office and Works: Montreal. Branch Office: Toronto.

JEFFREY
MATERIAL HANDLING EQUIPMENT

This COUPON

PERFECTION MFG. CO.
2186 EAST HENNEPIN AVE.
MINNEAPOLIS, MINNESOTA

Gentlemen: Please send me complete information about the Perfection Sanitary Pump.

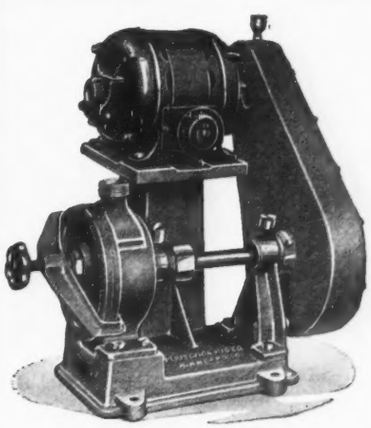
Name .....
Company .....
Address .....
City .....State .....

brings you

Perfection's story of sanitary pumping

Cleanliness, the essential qualification of any food manufacturing machinery, is one of the outstanding characteristics of the Perfection Rotary Pump.

It is easy to clean. Only 2 moving parts in the pump. It is quickly disassembled. The inside of the Perfection Pump is highly finished and free of unmachined recesses that provide a lurking place for dirt and bacteria.



Send in the coupon for full information about this non-churning, non-aerating, sanitary pump, especially adapted for the handling of food products.

Perfection Mfg. Company

2186 East Hennepin Ave.

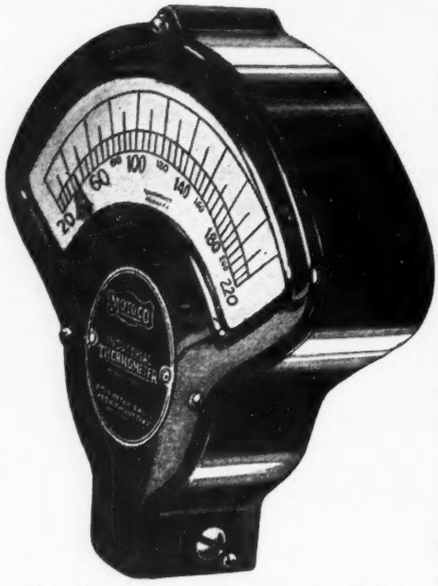
Minneapolis Minnesota

PERFECTION ROTARY PUMPS

MOTOCO SERVES MANY INDUSTRIES

THE easy reading characteristics of the Motoco Industrial Thermometer, combined with the essential accuracy of the instrument, due to its simple design and construction, have served to open wide the doors of industry to its use.

Wherever the frequent checking of temperatures is an essential function of production or of machine operation, the Motoco Industrial Thermometer has found a ready acceptance. In power plants of every size, it is safeguarding valuable equipment; in the preparation and preserving of foodstuffs, it protects the product from spoilage; in the textile field it keeps down production costs; in the lumber and woodworking trade it helps to cure wood better; in steam laundries it saves time, soap and clothes—and so on through many lines.



Moto Meter also manufactures a complete line of vacuum and pressure gauges.

It has proved its great usefulness so well that many manufacturers of special machines have adopted it as standard equipment. Today the users of such machines have come to expect it as standard equipment, and are demanding it on other machines not now equipped.

Our representative will gladly go over your thermometer problems with you and point out how the Motoco's greater efficiency will bring greater profits to your company.

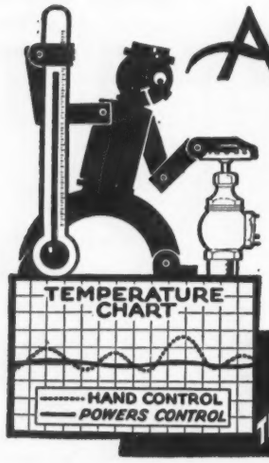
MOTO METER

GAUGE & EQUIPMENT CORPORATION

TOLEDO, OHIO

FACTORIES AT TOLEDO • LA CROSSE • CANADA • ENGLAND • FRANCE • GERMANY • AUSTRALIA

Coming . . . in October . . . the Second Model Plant Number of FOOD INDUSTRIES . . . first advertising forms close September 10th . . . write for further details . . .



Automatic Temperature Control

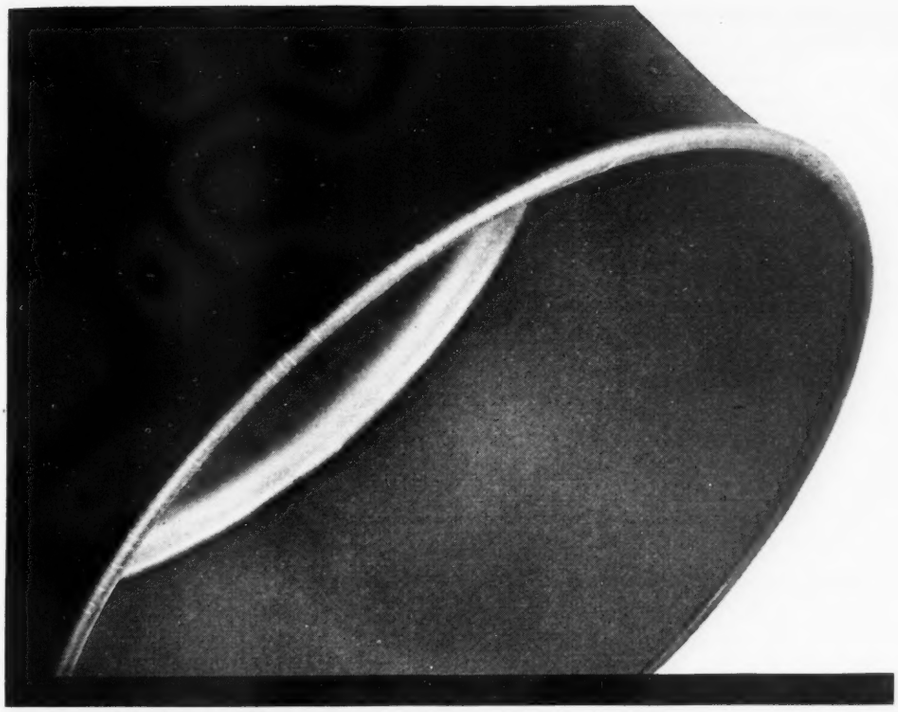
TO ERR IS HUMAN—eliminate the errors of hand control of temperature with the mechanical accuracy of a Powers Regulator. It will quickly pay for itself by speeding up production—helps you to get a still better and more uniform product, and stops steam losses due to overheating. Let our engineers study your problems of temperature control and recommend the type of regulator that will give the best results at the lowest cost.

CHICAGO—2755 Greenview Ave. NEW YORK—231 E. 46th St.

THE POWERS REGULATOR CO.

OFFICES IN 40 CITIES

40 YEARS OF SPECIALIZATION IN HEAT CONTROL



PROTECT-O-LINE
eliminates contamination from the inside

This enamel-like lining on National Steel Drums is not only edible but positively neutral so does not affect odor, taste or composition of products being shipped.

It insures absolute freedom from contamination and provides an excellent means of handling food products of all kinds.

Solids and liquids, quick frozen-fruits and similar foods can be shipped in absolute safety.

NATIONAL Open Head Steel Drums insure protection from the outside

These Open Head Drums can be furnished in either Quik-Lox or Snap-Lox types, both are air, oil and gas tight. The Quik-Lox features a unit lock rim which can be used over and over and requires no tools, nuts, bolts or screws. The Snap-Lox is similar to Quik-Lox but requires a tool for clamping lock rim into position. Both container heads are removable and there are no obstructions at the head of the drum when cover is out.

National quality and care of manufacture is built into these drums. Attractive color schemes are available which will aid in giving your products a quicker acceptance.

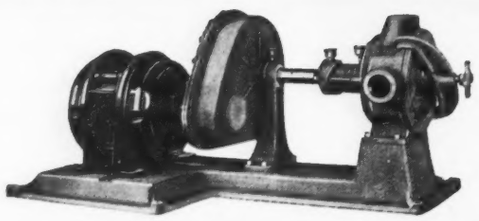
Consult National for progressive ideas in safe packing of food products.

QUIK-LOX
Locking the fully removable head in place with a simple movement of the lock-lever.

SNAP-LOX
Showing how easily the Snap-Lox rim is snapped and locked into position.

THE NATIONAL STEEL BARREL CO.....
3860 EAST 91ST STREET ··· CLEVELAND, OHIO

JUST 2 MOVING PARTS



VIKING SANITARY ROTARY PUMP

The Viking Sanitary Rotary Pump has just two moving parts. Quite naturally it is easier to clean . . and keep clean. Because of its simple design . . it requires less power to operate . . wear is practically eliminated.

All surfaces smoothly machined . . impossible for bacteria to lodge and breed. Approved by national and state boards of health. Starts without priming . . pumps with a steady smooth flow . . without churning, splashing or pounding. Very reasonable initial cost . . easy to install . . will give a lifetime of service with a minimum of repair and service expense.

Write today for FREE Viking Catalog and Special Foods Plant Bulletin.

VIKING PUMP COMPANY
CEDAR FALLS, IOWA

VIKING PUMPS

Make Every SATURDAY Your Fumigation Day...

With

LARVACIDE (Chlorpicrin) REGISTERED

The Ideal Fumigant

Start every Monday with a clean, sanitary plant.

In this way your food products will be kept free from every kind of insect infestation.

Larvacide may be used by your own men or our service men will take care of your regular fumigation requirements. Write for details.

LARVACIDE SERVICE, INC.
Division
ISCO CHEMICALS
INNIS, SPEIDEN & CO.
117-119 LIBERTY STREET, NEW YORK.
CHICAGO NEW YORK KANSAS CITY

FREE! 30 days' TRIAL

New TAG Steam Trap

—with Unique Differential Setting Feature

NEVER before in the history of Thermostatic Steam Trap manufacture has industry been offered a trap with outstanding element of the TAG Differential Setting Feature which makes it possible to discharge condensate at a temperature corresponding to a uniform differential pressure from 0 to 20 lbs. below the operating steam pressure . . . a sure guarantee of actual saving of steam dollars.

TAG, with characteristic thoroughness, has included other outstanding economies, among which are reversible as well as renewable Monel seats and discs, assuring double life to both these wearing parts.

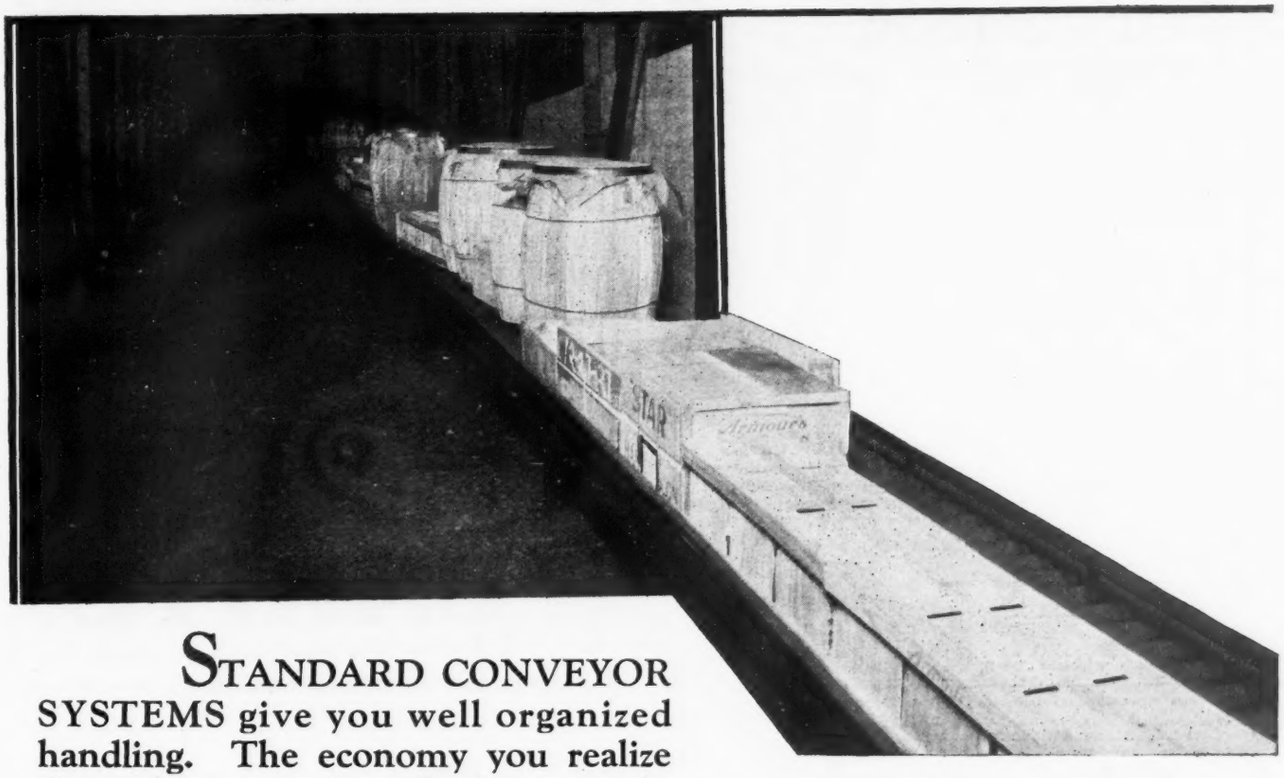
You alone can be the judge and jury of TAG Steam Trap performance right on your own steam lines. The coupon will bring as many traps as you need . . . FREE for 30 days' trial! No strings attached. Mail it TODAY!

C. J. TAGLIABUE MFG. CO.
Park and Nostrand Aves.
Brooklyn, N. Y.

C. J. Tagliabue Mfg. Co.
Gentlemen:
Please send us..... Traps No. 2 for free trial. After 30 days we will either return them or accept your invoice at $12 each, Net, F.O.B. Factory.

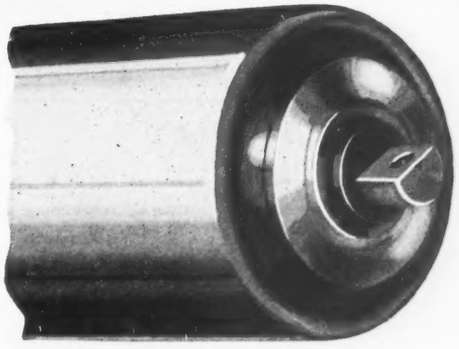
Name .....
Address .....

STANDARD CONVEYOR CONSTRUCTION IS MOST ADVANTAGEOUS



STANDARD CONVEYOR SYSTEMS give you well organized handling. The economy you realize thru their usage is brought about mainly by the construction. Here is combined design and strength that insures quick, dependable movement of merchandise. Smooth operation and cleanliness are features worth your investigation.

Because of a wealth of experience in designing conveying systems for every type of handling you can depend on the ability of our Conveyor Counsellors in properly suggesting a system for you.



Hubs have been eliminated in the new double curved roller shown here, and the end itself forms a seat for the bearing. The same three-point Standard bearing that has proved so successful in the past is being used in this new roller.

STANDARD CONVEYOR COMPANY

NORTH SAINT PAUL, MINNESOTA

Atlanta Office, 712 Flatiron Bldg.
Baltimore Office, 15 W. Franklin St.
Beaumont (Tex.) Office, P. O. Box 402.
Birmingham Office, 1202 Martin Bldg.
Boston Office, 755 Boylston St.
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Buffalo Office, 908 Ellicott Square.
Butte (Mont.) Office, 51 E. Broadway.
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Detroit Office, 420 U. S. Mortgage Bldg.
Evansville Office, 20 Furniture Bldg.
Fort Wayne Office 816 Kinnaird Ave.
Grand Rapids Office 533 Mich. Trust Bldg.
Jacksonville (Fla.) Office, 21 N. Ocean St.
Kansas City Office, 1321 Union Ave.
Los Angeles Office, 847 Traction
Milwaukee Office, 757 No. Water St.
Nashville Office, 178 Eighth Ave. North.
New Orleans Office, 504 Howard Ave.
New York Office, 461 Eighth Ave.
Omaha Office, 1124 Harney St.
Peoria Office, 115 So. Jefferson St.
Philadelphia Office, 1541 Spring Garden St.
Phoenix, Ariz., Office, P. O. Box 145.
Pittsburgh Office, 1517 Clark Bldg.
Portland, Ore., Office, 53 First Ave.
St. Louis Office, 3104 Magnolia Ave.
Salt Lake City Office, 204 Dooley Bldg.
San Francisco Office, 4401 San Bruno Ave.
Scranton Office, 723½ Crown St.
Seattle Office, 2301 5th St.
Syracuse, N. Y., Office, Van Vleck Road.
Toledo Office, 2319 Elm St.

Up-to-date commercial and industrial refrigeration

This book brings you the answers to many questions on the theory, design, installation, operation and testing of modern refrigerating systems. It is a practical, complete handbook for operating engineers in refrigeration plants, engineers engaged in designing and installing refrigerating equipment, and the man employed in servicing household refrigerators.

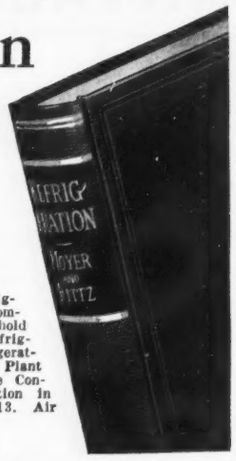
Refrigeration

Including Household Automatic Refrigerating Machines

By JAMES A. MOYER
State Director of University Extension in Massachusetts

and RAYMOND U. FITTZ
Assistant Professor of Mechanical Engineering, Tufts College

431 pages, 6x9, illustrated, $4.00



Chapter Headings—

1. Refrigeration Methods. 2. Systems of Refrigeration. 3. Properties of Refrigerants. 4. Compressors for Refrigerating Plants. 5. Household Mechanical Refrigeration. 6. Operation of Refrigeration Systems. 7. Thermodynamics of Refrigerating Systems. 8. Refrigeration Economics and Plant Testing. 9. Ice Making. 10. Cold Storage Construction. 11. Air Circulation and Ventilation in Cold Storage. 12. Cold Storage of Foods. 13. Air Conditioning and Cooling.

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You may send me Moyer and Fittz—REFRIGERATION, $4.00, postpaid, for 10 days' FREE EXAMINATION. I agree to remit for it or return it, postpaid, within 10 days of receipt.

Signed .....

Address .....

City and State .....

Official Position .....

Name of Company ..... Food 8-31

(Books sent on approval in the U. S. and Canada only.)

For every cleaning job in this tuna fish plant

CUTTERS, wooden tanks, concrete floors, wooden tables, steam cookers in the fish room; wooden floors and metal packing tables in the packing room; capping machines in the canning department; cans in can washing department; fish baskets, pipes, valves and hand trucks in a general cleaning tank; and presses, separators, and oil storage tanks in the by-products department . . . all are kept spotlessly clean with Oakite by one large California fish packing plant.

It will pay you to find out how Oakite cleaning can help you keep your plant clean and sanitary at less cost. Write to have our nearby Service Man call.

Manufactured only by
OAKITE PRODUCTS, INC., 26G Thames St., NEW YORK, N. Y.

OAKITE
TRADE MARK REG. U. S. PAT. OFF.
Industrial Cleaning Materials and Methods

SEARCHLIGHT SECTION

POSITION VACANT

CHEMIST, 35 to 45 years of age, of aggressive but pleasing personality, experienced in food industries, to head staff of an association laboratory specializing in technical research. P-92, Food Industries, Tenth Ave. at 36th St., New York.

POSITION WANTED

MAN with 18 years experience, knows national buyers personally and has close contact with important sales sources; also enjoys wide personal acquaintance with jobbers, merchandise brokers throughout the Middle West and Southern territory. Seeks permanent connection with reliable food manufacturer. References gilt-edge. PW-93, Food Industries, 520 No. Michigan Ave., Chicago, Ill.

SPECIALS FOR SALE

3—W. & P. Mixers, jacketed, 150 gal. Sigma Blades, motor driven.
1—Copper Jacketed Vacuum Pan, 500 gal.; 2—4-ft. 6-in. Milk Vacuum Pans.
4—Shriver 42x42-in. Filter Presses, 40 chambers, pl. and frame, open del.

We are liquidating the Surplus Canning Machinery of the

SNIDER PACKING CORP'N

Send for latest printed list.

We pay cash for your idle machinery—One machine or complete plant.

CONSOLIDATED PRODUCTS COMPANY, INC., 13-17 Park Row, New York. Barclay 7-0600

COPPER KETTLES

Practically New. All Sizes
50% off of list price
Mfrs. of nickel or copper coils
Copper work and re-tining of all kinds.
—also—
Buyers of used copper equipment.
BRIGHTON COPPER WORKS
2834 Spring Grove, Cincinnati, O.

Copper, Steam Jacket, Kettles

Used Kettles 20 to 300 gallon, also new ones.

THOS. BURKHARD, INC.
494-496 Flushing Ave., Brooklyn, N. Y.
Coppersmiths since 1836

BOUILLON CUBES POWDERED SOUPS

Well-known German firm manufacturing bouillon cubes (hydrolized proteins) wants to get in touch with American firm. Several European food factories have already adopted our process.

RW-91, Food Industries
6 & 8 Bouverie St., London, E.C. 4, England

ACCOUNTS WANTED

of Foreign or Domestic Merchants and Manufacturers who are wanting Ohio representation. We act as contact Agents in this Great Trade Empire. Address

WHOLESALE BROKERS, INC.
Marshall Building, Cleveland, Ohio

"SEARCHLIGHT" RATES

Food Industries

UNDISPLAYED:

Positions Wanted—5 cents a word, minimum charge—$1.00 an insertion.

Positions Vacant and other classifications—except equipment 10 cents a word, minimum charge $2.00 an insertion.

Allow 10 words for box address. No additional charge for forwarding replies.

Discount of 10% for payment in advance on 4 consecutive insertions of undisplayed advertisements.

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SEARCHLIGHT SECTION

(continued from opposite page)

Professional Services

UNION

Rebuilt Machinery

ATTRACTIVE PRICES · RELIABILITY · PROMPT DELIVERY

ALL MACHINES RELIABLY GUARANTEED FOR ONE YEAR

Complete Stock
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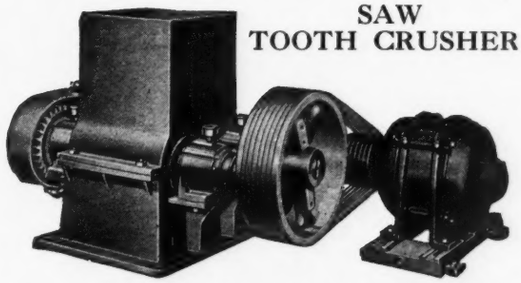

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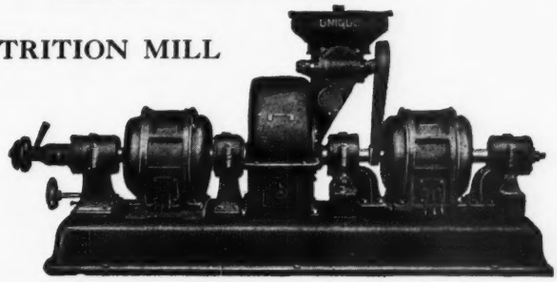

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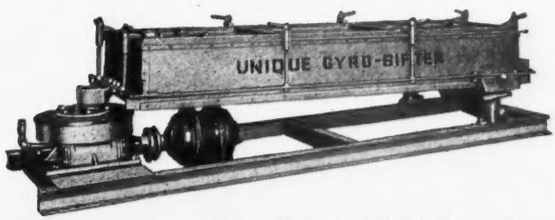

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• TO ADVERTISERS •

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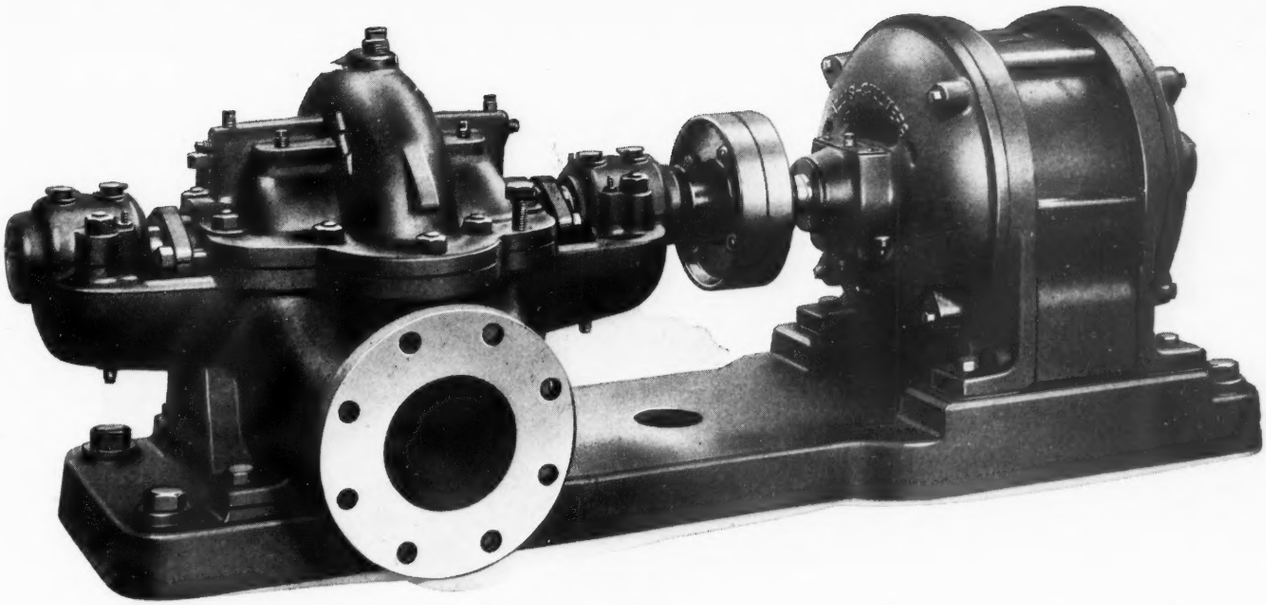
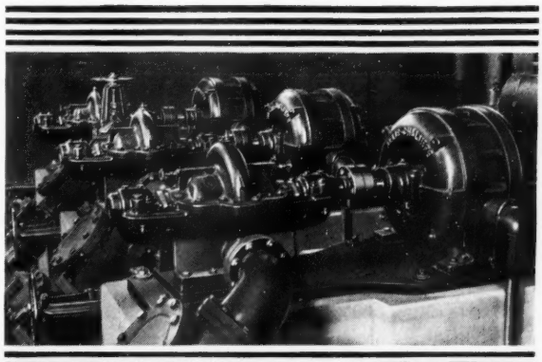
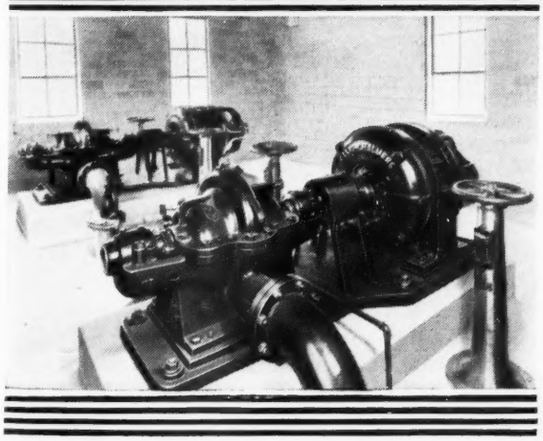


... a widely used unit *for* General Purpose Pumping





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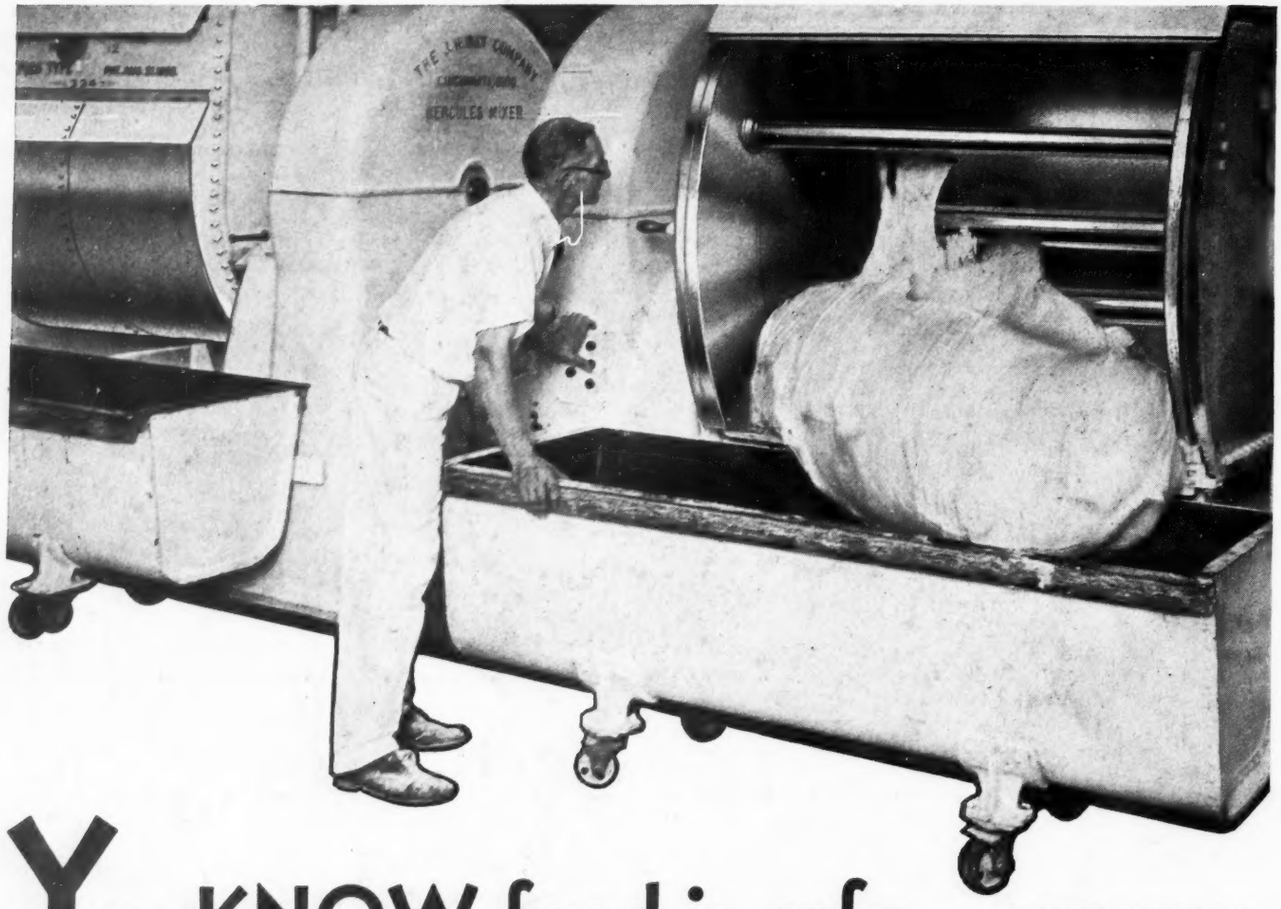

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